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ABSTRACT

Originally developed to serve the needs of bilingual education and English as a second language (ESL) instructors in the Compton Unified School District in California, this replication manual provides content, organization, and lesson plans for a 14-day, 41-hour course to train teachers in the fundamentals of computer operation and structure, elementary BASIC programming and command structures, and use of a computer-assisted instruction (CAI) authoring system. The context and examples used throughout the lessons are oriented to bilingual education subject matter, but the principles and skills presented generalize to all subject areas. The manual first provides information on determining the appropriateness of the program to any replication site or target population and discusses the various issues involved. This is followed by step-by-step guidelines for implementation, which include a list of instructional materials used in the courses and an outline of workshop schedules. Plans are then provided for the 20 lessons that cover the three workshop segments: (1) system introduction; (2) authoring systems; and (3) advanced authoring techniques. Appendices contain worksheet handouts; a software evaluation guide; a description of the JOURNAL1 database system; workshop evaluation forms; reference materials; a short glossary of computer terms; two two-page bibliographies listing references on CAI in general and CAI for ESL and bilingual education; and a certificate for completion of training. (DJR)

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APPLIED MICROCOMPUTER TECHNOLOGY IN EDUCATION

Compton Unified School District

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Teacher/Aide Training Series in Computer Programming

Inservice Manual

An E.S.E.A., Title VII Academic Excellence Project

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Inservice Manual

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APPLIED MICROCOMPUTER TECHNOLOGY IN EDUCATION

COMPTON UNIFIED SCHOOL DISTRICT

Teacher/Aide Training Series
in Computer Programming

Inservice Manual

Introduction

Personal computers have become common place equipment in many schools. Their classroom use, however, is generally limited to canned programs providing games and drill in basic skill subjects. At best, these available programs tap only a small portion of the computer's potential in providing learning and instructional management assistance. This is not simply a function of the present maturity of the educational software available; it reflects as well the highly variable nature of classroom content, student composition and teacher management requirements. Ultimately these conditions will always be more demanding than can be supplied by the software mass market. If the existing inventory of educational software is not adequate to the potential demands of the classroom environment, it nevertheless usually defines how personal computers will be used in the classroom. Most teachers lack sufficient insight into computer programming and software structures to imagine or operationalize software solutions to their instructional and management tasks. In their lack of understanding and comfort with the medium, they fail to see which tasks can be automated, how that automation can be accomplished or how their tasks can be subdivided into computer guided and teacher guided parcels.

This manual provides content, organization and lessons for a fourteen day, forty-one hour course to train teachers in the fundamentals of computer operation, computer structure, elementary BASIC programming and command structures and one educational software construction system. While no single computer course can hope to provide all the skills necessary to invent and solve the multitude of applications for which the classroom computer is appropriate, teachers completing this

course will have entry level competence and confidence to invent interactive programs tailored to many of their own instructional, reinforcement, testing, and record keeping requirements. Specifically graduates of the program will be able to:

- operate a TRS-80, Model III or Model 4 and/or Apple 2e computer, disk drive system and printer
- interpret simple programs written in BASIC
- edit a simple program written in BASIC
- write simple loop programs written in BASIC
- create and modify interactive student oriented exercises written with the Radio Shack Authoring System
- apply end user criteria in judging the utility of various classroom oriented software packages
- write or edit Authoring System programs designed to reinforce or test, student subject matter and basic skill knowledge.

The course presented in this manual was originally developed to serve the needs of bilingual education instructors. As such, the context and examples used throughout the lessons are oriented to bilingual education subject matter. However, the principles and skills presented readily generalize to all subject areas making the course applicable to all classroom teachers.

Program Replication

This section of the manual is designed to help readers determine how well the "Applied Microcomputer Technology in Education" inservice series meets their need for an inservice program to serve teachers (and by extension) students in their own district. For those who do decide this workshop series is appropriate, this manual will provide guidance in replicating the sessions.

Replication is the process of duplicating, in whole or in part, a program developed and proven at another site. The replicator may chose to either duplicate parts of the original or, under certain circumstances, modify the original procedures. The new site receives the benefits of another's experience. A new site will only achieve similar results to the extent that its procedures meet the original conditions specified. In the following pages you will be led through a process to determine the appropriateness of the inservice workshop for your district and to establish a plan for replicating this series, should you find that it meets your district's needs.

Appropriateness of Inservice Program

There are ten factors that should be considered in deciding whether or not the Applied Microcomputer Technology inservice series is appropriate to your district:

1. The appropriateness of the workshop objectives
2. Nature of the target population
3. Acceptance of the methodological approach being promoted
4. Acceptance of computers and computer education

5. Quality and breadth of the inservice materials
6. Quality of the evaluation data
7. Attractiveness of highly structured programs
8. Internal district resources to provide the inservice
9. Resources available from the originating district
10. The cost of the program

These ten factors are listed in the approximate order in which they should be evaluated. Each is described in some detail in the remainder of this section.

As you assess each factor, you will need to consider your own district and the inservice program very carefully. We suggest that you use the matrix at the back of this section as a convenient checklist when you conduct your analysis. Although no one can decide which factors should control your final decision or how many factors must be considered for or against the replication, the matrix will allow you to see all of the elements together.

Appropriateness of Workshop Objectives

The inservice is directed toward bringing teacher computer knowledge, programming comprehension and ability to manipulate specific Computer Assisted Instruction (C.A.I.) programs up to a defined criterion. The skills taught include elements of programming in BASIC and use of the Radio Shack Author I System. The C.A.I. programs that are the focus of the instruction are designed to reinforce English as a Second Language knowledge and skills. In some respects, this is a fairly narrow objective. It does not include skills necessary for extensive programming or creation of reinforcement modules for the

Authoring System. It expects proficiency to be measured by classroom use of learned skills and to be tied to this criterion.

Radio Shack's Authoring I system is only one of several authoring systems available for use by instructors. While it has many good features, including ease of use, adaptability of item analysis, test construction, and record keeping, there may be other authoring systems that provide additional features your teachers may need. It is recommended that several authoring programs be reviewed and their key features compared before a decision to inservice in a particular system is made.

Nature of the Target Population

The workshop was originally designed to effect the skills of elementary school teachers and (to some extent) instructional aides who work with Spanish and Samoan limited English proficient (LEP) students. In evaluating your own teacher population, you should consider not only the grade levels they teach and whether they work with a group of children who can use the results derived from the skills taught to teachers, but also what deficiencies the teachers have in the fundamentals of computer operation, computer structures, introductory BASIC programming and command structures and an educational software construction (AUTHOR I) system. Teachers who already possess entry level computer skills may require a modified program. If other than ESL teachers and aides are to participate in the inservice training, it may be necessary to modify the examples used in the training sessions.

Acceptance of the Methodological Approach

The elementary grade instructional modules that teachers learn to implement (once they have learned entry level BASIC commands and structures and use and editing of the Radio Shack Author I authoring system) employ recall and recognition skills. There is little material that emphasizes higher level cognitive skills at this stage. Reinforcement and learning are accomplished by repetition and verbal reward. This drill and reinforcement approach is widely used in learning language (the purpose of the project and therefore its modules) and is applicable to other disciplines. But the approach also has its limits. It is not being used for teaching skills requiring higher level cognitive skills. If the emphasis is to be on higher level skill attainment new programming or other methodologies should be considered.

This drill and reinforcement approach may be considered supplementary to the Natural Approach to Second Language Acquisition in that the Natural Approach emphasizes comprehensible input rather than cognitive-based instruction. One must determine whether the drill and practice on vocabulary sentence structures and grammar is compatible with the district's instructional model(s) being used to teach language.

Acceptance of Computers and Computer Education

Many individuals believe that computers and computer education lead to distortion of traditional values and dehumanization of the educational process. For them, machine instruction cannot take the place of interaction between responsive human beings.

It is true that computerized instruction tends to focus on repetitious recall and rote exercises: they are the easiest programs to construct. Interactions calling for much more than choosing the correct

response out of four possibilities or filling in a proper word are difficult to assess with a computer program and demand human evaluative efforts. An inservice training series that (1) teaches teachers how to work with computers, (2) introduces them to BASIC program commands and structures and (3) teaches them how to use and edit an authoring program assumes that the participants accept the value of computers, computer education and computer assisted instruction for these limited purposes.

Quality and Breadth of the Inservice Materials

The inservice materials include an outline of each lesson to be taught, a discussion or "background" with each lesson offering ideas and suggestions about the teaching of the lesson and other necessary support materials such as handouts, worksheets, and technical background information for the lessons. They have been developed, field tested and evaluated over a two-year period. A complete set of materials is included in this manual.

The materials in this manual should be reviewed in considerable detail since their adequacy will govern the ease with which the inservice can be replicated. In reviewing the available materials, consideration should be given to the clarity and ease of implementation of instructions, the level and content of the materials themselves and their compatibility with materials already in the district.

As a potential adopter of this program, you should decide what additional inservice materials, if any, you would want to add and the development cost (staff time or dollars) of those additions. Add these costs to the overall cost of implementing the program in your decision process.

Quality of the Evaluation Data

Evaluation reports are available for all years of program implementation at the originating site. These reports describe the impact of the inservice program on several student outcome measures and on specific teacher behaviors and learnings. In addition, these reports include certification of the activities as observed by the independent third party evaluator. Student impact data is described in relation to the performance criteria selected by the evaluator in accordance with an evaluation plan that is also described in each report.

These evaluation reports should be reviewed as carefully as any other project material. Particular attention should be given to the adequacy of the evaluation design, the description of the project implementation, the adequacy of the student impact measures, the process data on teacher behavior, learning and change and the extent to which the evaluator's conclusions seemed warranted by the data.

If you do not feel qualified to assess the evaluation reports yourself, ask for a critique from either a knowledgeable district administrator or an independent evaluator.

Attractiveness of Highly Structured Programs

This inservice workshop series is highly structured. The set of materials as well as the methodologies provided for delivering the information is based on a systematic approach to delivery of objectives. The skills taught are based on a well defined curriculum and all lessons follow the same basic format. Since there is considerable variation in the ability and willingness of teachers to adopt methodologies and in instructors to teach in a formatted systematic manner, careful considera-

tion should be given to the appropriateness of this approach in a given district.

Internal District Resources to Provide the Inservice

There are two issues subsumed under "internal district resources." The first is concerned with a qualified person or persons to teach the inservice course. The instructor(s) must have a thorough working knowledge of BASIC programming and language, the Radio Shack Authoring I System, and general computer expertise. These functional requirements as well as time commitments should be examined.

A second issue concerns the acceptance of new programs by extant professional and administrative staff. Too often, programs fail because change is resisted by key personnel in a school or school district. While there are steps that can be taken to increase the acceptance of a new program, the need for that action must first be recognized.

Consider your experience with the instructional staff to be targeted. Do they generally incorporate new instructional approaches in their teaching? Are there staff leaders whose assistance you could recruit? What additional activities beyond the program itself would you need to add to insure classroom use of the authoring system? Do you have the resources to provide it and would the final outcome be worth the additional effort?

Consultant Support Available Through the Originating District

The kinds of help and support the originating program or external consultants can offer the replicator is the final substantive factor to be considered in determining the appropriateness of this program for your application. If the originating program can offer consultant support by

knowledgeable individuals, or if appropriate external consultants are available, this will aid the replicator in avoiding many pitfalls in the process of inservice replication/implementation. No document, regardless of how well written and how intelligible, can replace the support provided by consultants who have direct experience with the content and structure of the workshop. Experience communicated by one who has implemented a program is invaluable in replicating a program. The amount of support needed to replicate leads directly to the issue of program cost.

The Compton program recognizes the need for low cost consultant support in inservice replication. There are several individuals in the district or working with Radio Shack who have expertise in the hardware, programming and instructional requirements of the inservice series. These individuals are available to assist a school or district in implementing the program. As well, on-site visits to the Compton program for potential replicators can be arranged.

Cost of the Program

Many individuals and districts make the question of cost of inservice or program replication (installation and implementation) their major concern and base their decision to replicate primarily on issues of cost. This manual presents the argument that the issue of cost, while critical to the final replication decision, must only be raised at the end of the decision-making process. Otherwise, the programmatic factors may be slighted and the question of potential benefit to your district may never be considered. Ways have been found to procure the dollars to install and implement a program or to lessen the cost of an otherwise desirable program.

There are several costs to a potential replicated program. These include "start-up" costs (installation) and ongoing costs (program implementation). Many can afford higher start-up (one-time) costs as long as ongoing costs are minor or remain constant. Installation costs include such items as the cost of consultant support/advice to installation, cost of non-expendable program items and materials (e.g. reuseable manuals), cost of on-site personnel time for replicating the program and cost of evaluating the installation of the program. Ongoing costs include expendable program materials (e.g. workbooks which must be purchased or reproduced), administrative or supervisory support to program implementation, cost of personnel to implement the workshop series and finally, evaluation costs for assessment of program implementation (results and effectiveness).

In considering installation and implementation costs, attention should be paid to the reasonableness of costs for required commercial material and printed materials available from the originating site. As well, consultant costs to the replicating district must be minimized. Time sharing replication with neighboring districts should be encouraged as a means of distributing cost over a broader base.

Estimated inservice training costs to the Applied Microcomputer Technology in Education workshop are given for 20 participants at a workshop. The data on the following page provide reasonable estimates for the various categories of expense associated with a single implementation cycle of the inservice program.

Materials:	
Workbooks and References	$ 140.00
Software	$ 150.00
Instructor (41 hours @ $25)	$1,025.00
Substitutes or Teacher Stipends for Weekend Workshops (820 hours)	$1,200.00
Coordinators (4 professional days @ $250)	$1,000.00
Publicity/Materials	$ 100.00
Evaluator (optional)	$ 500.00
Computer Facilities (in place)	0.00
TOTAL:	$4,115.00

A Summary for the Replication Decision Plan

The following matrix can help the potential replicator visualize the factors to be considered in replicating an inservice series.

FACTOR TO BE CONSIDERED	RESPONSE GROUP NEEDS AT REPLICATION SITE			
	TEACHERS	ADMIN.	OTHER PERS.	STUDENTS
Philosophy				
Goals				
Objectives				
Program Approach				
Program Activities and Detail				
Program Materials				
Program Data/ Evaluation				
Consultant Aide/ Support				
Program Cost				
Community Support				

Similarly, the Network, Inc. in Resources for Dissemination, 1983, identified a series of fourteen questions potential replicators should ask of themselves and the originating project. These questions are:

- What goals and objectives is the program designed to achieve and what goals and objectives am I and the district seeking to fulfill?
- What evidence proves the program achieved what it claimed and am I and the district satisfied with that level of evidence and effect?
- In what administrative, geographical, and educational settings has the program been used and how does that match to our setting?
- Exactly what must I and the district do to achieve success and am I and the district willing to do that?
- Does the program allow for adjustments and additions (adaption) as well as adoption and does this degree of flexibility suit my needs and the district's needs?
- Does anything have to be added at our site and am I and the district willing and able to do so?
- How much change will this program create and how much change can I and the district tolerate?
- How sophisticated must the users or participants be and are they in my district?
- How is the program conveyed to us as new users and what kinds of training and assistance will we need to implement the program?
- What follow-up and problem-solving assistance is given and will we need external follow-up and assistance?
- How rapidly does the program achieve its goals and what is my and the district's timeline for change?
- How many individuals can participate simultaneously and does that satisfy our needs?
- Does the program include evaluation procedures for measuring success and do they meet with my criteria for judging success of replication?

- What does the program cost (purchase price for adoption and training, cost of implementation and maintaining program, cost of learning materials and other materials -- reusable or reproducible, cost of additional resources in money personnel, facilities, equipment, and materials) and can the budget handle the cost?

The potential replicator will be able, from the above information in this section, to determine the advisability of a particular program replication. Making a decision to replicate a program is but the beginning. A successful replication demands program implementation.

Course Implementation

It is suggested the course be conducted in three workshop segments with a period of no more than four weeks between segments to maximize learning retention.

The greater the number of weeks of separation between the three course segments offered, the greater the amount of review necessary in the first new sessions offered in each segment. For example, if each series of sessions is separated by five weeks or more, extensive review has been found to be required, as approximately one-quarter to one-half of what has been taught but not practiced in the interim has been forgotten. An optimum structure for the three segments would be a sequential and continuous presentation over a fourteen week period or over 17 weeks with a one week break between each set of workshop sessions.

The first segment to the course, "System Introduction" is a three day, twelve hour workshop providing teachers with an elementary command of computer usage and BASIC programming techniques. This workshop segment was implemented in the Compton Unified School District and field tested by forty program participants including teachers, aides, and secretaries from two Compton schools - Longfellow Elementary and Laurel Street Elementary School - who were trained in beginning skills with computers. The goal was to provide training that would allow the participants to operate the computer center at full capacity, using project developed Computer Assisted Instructional (CAI) lessons based on student assessment and language usage (English, Spanish and Samoan).

The second segment to the course, "Authoring System," is a six day, twelve hour workshop introducing teachers to a system that allows them to begin designing Computer Assisted Instructional materials unique to their classes. Twelve teachers from Longfellow Elementary School in Compton Unified School District participated in the initial field test of this segment.

The third segment to the course, "Advanced Authoring System Techniques," is a five day, seventeen hour workshop, designed as a follow-up to the two prior course segments. This third series of sessions instructs teachers in the authoring system's refinements; those advanced system techniques necessary for full use of the AUTHOR I capabilities. Twelve teachers from Longfellow Elementary School in Compton Unified School District participated in the field test version of this course segment.

Trained participants are expected to involve other professionals and paraprofessionals at their school sites and display leadership in the school community that would ultimately benefit students, teachers and parents. The trained participants are expected to be able to communicate and to integrate information and ideas electronically--using the computer as a tool for creative, practical instruction and management.

The course uses a variety of techniques to arrive at its instructional goals. Initial learning and reinforcement of learning occurs through lectures, demonstrations, discussion (questions and answers), hands-on computer experience and individual reading/ homework during non-workshop hours. Simulation games, group/individual projects and guests (programmers, evaluators, community speakers) can enrich the experience.

The course uses TRS-80, 48K Model III or Model 4 computers with two disk drives and a printer for training participants. In the optimum setting one such machine should be provided for each participant since the subject matter requires a great deal of motor skill and reinforced learning. A network of one host computer with guests will also serve.

If necessary, a minimum of seven TRS-80, 48K computers (six guests and one host computer) with dual disk drives and a printer can be used to train 40 participants. These seven machines would have the capacity to form a network of six student (slave) computers with one controlling program.

An Apple 2e, 48K computer with disk drive can also be available to give participants experience with another system found in most California school districts.

The basic instructional materials used in the first course segment are:

Usborne Guide to Understanding the Micro, Usborne Hayes Electronics.

Introduction to Computer Programming: Basic for Beginners, Usborne Hayes Electronics.

Getting Started with TRS-80 BASIC, Radio Shack.

A set of project developed materials: glossary, reference materials and twelve worksheets.

Reference materials for this segment include:

Foreign language textbook (Spanish/Samoan).
Spanish-English, Samoan-English dictionaries.
Samoan Dictionary, G. B. Melvin, Government of Western Samoan and Government of America Samoan.
Consultant prepared worksheet (Samoan/English).
Commercial diskettes/tutorials such as "Typing Tutor."
Teacher prepared diskettes based on student needs.

The basic instructional materials used in the second course segment are:

Coursework Development with TRS-80 AUTHOR I; Student Manual, Cat. #26-2698, Tandy Corporation, 1984.

Authoring System for the TRS-80 (with floppy disks), Cat. #26-1727, Tandy Corporation, 1984; including Instructor's Guide and set of colored overhead transparencies and the Network 2 SEND/RECEIVE program.

A set of project adopted materials from the Authoring System for the TRS-80 supplied as student handouts.

The basic instructional materials used in the third course segment are:

Coursework Development with TRS-80 AUTHOR I; Student Manual, Cat. #26-2698, Tandy Corporation, 1984.

Authoring System for the TRS-80 (with floppy disks), Cat. #26-1727, Tandy Corporation, 1984; including Instructor's Guide and set of colored overhead transparencies and the Network 2 SEND/RECEIVE program.

The instructor presenting this course must have thorough familiarity with TRSDOS, the Radio Shack disk operating system, and with the concept of authoring systems and Radio Shack's AUTHOR I system.

In preparing for the course the instructor should keep in mind that the workshop materials are not totally self-explanatory to the student. Students with no computer experience will require a great deal of support from the instructor. It is appropriate to require minimal computer proficiency such as that gained from the three day "System Introduction" segment as a prerequisite to enrollment in the second segment of the course and completion of the six day "Authoring System" segment as a prerequisite to enrollment in the third segment of the course.

In general, sessions in each segment are sequenced to provide a review of the major concepts in the previous session, a lecture and demonstration of the current day's materials, concept review materials, quiz and hands-on activities. While this sequence will generally be appropriate, the amount of information to be transmitted is likely to confuse the student unless hands-on practice is interspersed with lecture and demonstration. After the initial session in each segment, the instructor should allow students to practice clusters of newly introduced concepts or operations (every four to five concepts).

Much of the workbook material provided with this course relies heavily on rote responses which many workshop participants (teachers) will find frustrating. These materials will best be used in a group mode in which the entire class completes the activity as a unit. Enthusiasm can be generated by making the responses rapid-fire. In sessions where large amounts of arbitrary new material (e.g.; segment two, sessions 12, 13, and 14; and segment three, sessions 17B, 18A, 19A, and 19B) are presented, the materials can be broken up into smaller segments or used as follow up to the hands-on activities. Workshop participants should be encouraged to make notes in and maintain their workbook. These can be reviewed, studied and referred to throughout and after the workshop.

A review activity is provided at the beginning of every session. Since information accumulates rapidly in this workshop these reviews should be followed carefully, and where necessary (as judged by inspection of participant responses) should be augmented with instruction.

Many of the names (labels) given the operations or concepts introduced in the second and third segments will encounter negative transfer (i.e., the meaning attached to the name or label is not as expected by the student). Examples include: "page," "question," "text," "lesson," etc. in segment two and "weight:field," "answer label," "hints," "control," "reference code," "lesson score file," "lock-out techniques," etc., in segment three. The instructor must be aware of those occurrences and provide appropriate instruction and practice to help the student learn the vocabulary and its proper use.

The quiz and summary for each lesson in segments two and three is a review/reinforcement activity. A lesson quiz and/or summary can be given as an overnight homework assignment, especially when workshop time is at a premium. With particular lessons, this approach has in fact been suggested in that session's background discussion.

In the third segment, the break between each day's session A and session B has ranged between 10 and 20 minutes. This amount of time has been found to offer comfort and stretch breaks to workshop participants as well as enough time to "decompress" and finish absorbing the "A" session before beginning the "B" session for that day.

Workshop Schedule/Outline
for Segment I

	Hour 1	Hour 2	Hour 3	Hour 4
Day 1	• Introduction to Project • Introduction to Workshop	• Introduction to BASIC Programming I: -Immediate Commands Statements	• Introduction to BASIC Programming II: - Variable Types - Elementary Programming	
Day 2	• Review of Day 1 Events. • Introduction to BASIC Programming II: con't	• Introduction to BASIC Programming III: -Logic Structures for Program Control -Specialized Routines for Classroom Applications	• Whole Network Operations	• Downloading CAI programs. Changing response strings and variables.
Day 3	• Review of Day 2 Events. • Introduction to BASIC Programming III: con't		• Criteria for Assessing Programs	• Closure, Summary and Evaluation.

Workshop Schedule/Outline
for Segment II

	Hour 1	Hour 2
Day 4	• Introduce AUTHOR I Class and Software • Introduce TRS-80	• Prepare the computer and accessories for courseware development with AUTHOR I • Learn some technical terms about computer
Day 5	• Explain the general structure of AUTHOR I authoring system vs. authoring language • Illustrate special keys and features	• Learn the five command program (modules) of authoring system • Learn to take a lesson
Day 6	• Introduce four types of displays and symbols which represent them • Explain rules which govern the length and naming of a lesson	• Learn to read the menu of different modules on screen and how to review and existing lesson • Learn plans and procedures to follow in developing a lesson
Day 7	• Learn and review how to pland and sketch with page symbols the flow of a lesson including text, question, glossary, and control page • Introduce text page - purpose and types of entries	• Use the computer to add, edit, and shift text on a text page
Day 8	• Hands-on practice in adding, editing, and shifting text, inserting and deleting text or line on a text page	• Build an actual lesson
Day 9	• Introduce the concept of computer graphics and some suggested uses of it • Learn to use graphics editor to create and add graphics to text page	• Learn some suggested uses of special characters and add these characters to text page

Workshop Schedule/Outline
for Segment III

	Session A	Session B
Day 10 1½ hrs. per session	• Practice calling DIR; AUTHOR program; interpret different menus • Review previously taught authoring material: five command programs; edit text; insert and delete, graphics and special characters	• Add kinds of QUESTION pages to a lesson: single-keystroke, multiple characters, sliding cursor • Introduce data fields on ANSWER portion of QUESTION page • Learn concepts of ANSWER judging
Day 11 1½ hrs. per session	• Explain and access data fields on HINT portion of QUESTION page • Learn categories of hints; tries and triggered hints • Learn types of hints: "on-page," "reference," and hint "sequence"	• Add hints to HINT portion of QUESTION pages • Add labels to TEXT page to identify location of each hint
Day 12 1-3/4 hrs. per session	• Review components on QUESTION page • Introduce purpose and functions of GLOSSARY page • Review procedure to request a definition entered • Add, maintain and edit a lesson GLOSSARY page	• Learn how and when to review pages • Search a desired page by page number and string of specified characters • Use the Review/Edit menu to manipulate a lesson
Day 13 1½ hrs. per session	• Introduce CONTROL page functions and tailoring a lesson path to a student • Learn concept of "branching"-internal vs. external, conditional vs. unconditional • Add and use CONTROL page	• Explain the role of TEACH program • Re-examine CONTINUATION symbol and capability within a lesson • Practice: Take a lesson
Day 14 1½ hrs. & 2 hrs. per session respectively	• Learn to use PRTVERF program • Connect equipment (printer) to microcomputer for printing properly • Introduce procedure for printing hard copy of a lesson and interpret the listing produced by verification of lesson	• Learn to use STUDENT program to enroll students in a lesson SCORE file • Discuss ways to allow and limit lesson access to specific students or groups of students • Use PRTSCORE, a BASIC program, to print out lesson scores

LESSON PLANS

SEGMENT I

SEGMENT I

Lesson 1

TOPIC: Introduction

OBJECTIVES:

A. To introduce participants to the nature and organization of the Applied Computer Technology in Education program.

B. To describe the organization of the twelve hour workshop segment in which they are participating.

METHODS:

Lecture by project director and workshop presentor, question and answer period.

MATERIALS:

Project Abstract

Workshop Agenda

EQUIPMENT:

None

TIME:

½ hour

Background

Introduction

Participants and presentors should introduce themselves, stressing their professional assignments and their prior background experience with and/or reactions to computers.

Introductory remarks by both presentors should be as brief as possible; no more than five minutes being spent on the description of the project and no more than ten minutes on the workshop. Key points that should be made in describing the workshop include:

- it will be primarily a hands-on learning experience using the computer
- successful learning will depend on participants asking questions when they don't understand
- the machines are available for use in completing workshop tasks outside the workshop time scheduled
- the workshop relies heavily on independent study; particularly of key programming concepts.

SEGMENT I

Lesson 2

TOPIC: Introduction to Computers

OBJECTIVES:

A. To describe the historical development of the modern microcomputer.

B. To develop familiarity with the physical characteristics and controls of the computer; its keyboard and major peripherals.

METHODS:

Lecture, demonstration, hands-on experimentation, question and answer.

MATERIALS:

Glossary of terms

Floppy disks

Usborne Guide to Understanding the Micro

EQUIPMENT:

Operational computers, floppy disk drives, printers.

TIME:

1 hour

Background

Introduction to Computers

The lecture should be kept as brief and non-technical as possible. Key points to be covered include: miniaturization, power, mass production costs, the on-off logic of computer operations, the fundamental stupidity of a computer.

Explanations of computer controls should be kept as simple and non-technical as possible. Each operation should be demonstrated and explained fully. Participants should practice each operation on their machine. Key operations include On/Off, keyboard layout and key functions, disk loading, care of disks, cursor movement, control keys, cold boot, printer and modem operations. If the local computer system uses guests, control of the network should be explained and practiced.

The concepts of operating systems, computer languages, and levels of language should be explained as they relate to your particular machines: stressing the need for practical human language and practical computer language.

The glossary and Usborne book are used as references in the presentation. The materials themselves should be assigned for out-of-class reading.

SEGMENT I

Lesson 3

TOPIC: Introduction to BASIC Programming Language I

OBJECTIVE:

To learn and use Immediate Mode Commands in BASIC.

METHODS:

Lecture, demonstration, hands-on experience, question and answer.

MATERIALS:

Usborne Introduction to Computer Programming: BASIC for Beginners

Getting Started with TRS-80 B.A.S.I.C.

Reference Material Worksheets/Handouts

Worksheet/Handout #1.

EQUIPMENT:

Computers and peripherals.

TIME:

1 hour

Background

Introduction to BASIC Programming Language I

The emphasis in this segment is on using standard commands to control computer operation including disk control and program calling as well as the immediate operations such as "PRINT", "INPUT" and arithmetic operations. Participants should follow worksheet/handout outline, determining what happens at each step.

Instructor should remain available to answer questions as they arise, monitoring all participants to identify general problems requiring group explanations.

Participants should be encouraged to try additional examples at each worksheet/handout step, placing emphasis on understanding what is taking place.

Time should be made available for independent practice outside the regular time allotments.

SEGMENT I

Lesson 4

TOPIC: Introduction to BASIC Programming Language II

OBJECTIVES:

A. To understand the concepts of variable types.

B. To learn and use elementary programming commands.

METHODS:

Lecture, demonstrations, hands-on experience, question and answer, individual practice.

MATERIALS:

Usborne Introduction to Computer Programming: BASIC for Beginners

Getting Started with TRS-80 B.A.S.I.C.

Reference Material Worksheets/Handouts

Worksheets/Handouts #2, #3, #4, #5 and #6.

EQUIPMENT:

Computers and peripherals.

TIME:

3 hours

Background

Introduction to BASIC Programming Language II

This segment introduces the concept of variable types and their control in programming segments. "Variable types" is an unfamiliar, and to some, uncomfortable concept. Be prepared to explain in detail with examples related to the underlying logic and the ambiguity of data as they relate to machine logic.

The critical nature of correct syntax should be stressed. If more than one computer brand is available in the lab, e.g. TRS-80 and Apple, the differences in syntax should be illustrated.

Finally, simple programming steps, e.g. line numbers, use of "NEW", "LIST", "HOME", "CLS", "INPUT", "PRINT" and "RUN", are introduced. Participants should practice each command beyond the requirements of the worksheets/handouts to insure understanding.

SEGMENT I

Lesson 5

TOPIC: Introduction to BASIC Programming Language III

OBJECTIVES:

A. To learn and use logic structures for program control.

B. To learn and use specialized routines for classroom applications.

METHODS:

Lecture, demonstrations, hands-on experience, question and answer, individual practice.

MATERIALS:

Usborne Introduction to Computer Programming: BASIC for Beginners

Getting Started with TRS-80 B.A.S.I.C.

Reference Material Worksheets/Handouts

Worksheets/Handouts #7 through #12.

EQUIPMENT:

Computers and peripherals.

TIME:

4 hours

Introduction to BASIC Programming Language III

Logical operations such as "IF...THEN", "GOTO...", "FOR... NEXT" and machine syntax are introduced. The concepts themselves are difficult and syntax errors may confound the learning process by obscuring the source of errors. Be prepared to analyze participants input carefully so that the source of errors can be identified and corrected.

In the second part of this session, participants learn to use specialized routines appropriate for teaching, such as problem formats and simple graphic control. These can be fun and participants should be encouraged to explore alternative problems and formats.

With the background preparation to date, participants examine project developed CAI programs to see how the various structures and commands are used in creating an instructional program. Participants react to the lessons, recommend courseware modifications that would best suit their students' understanding and capabilities. Programming of content is studied to prepare the participants for personalized authoring.

SEGMENT I

Lesson 6

TOPIC: Whole Network Operations

OBJECTIVES:

A. To control the TRS-80 network system from host computer (dual disk drive and printer) system to six (6) guest computers.

B. To create an operational learning center for students/teachers/community.

METHODS:

Lecture, demonstration, hands-on experience, questions and answers.

MATERIALS:

None

EQUIPMENT:

Computer network

TIME:

½ hour

Background

Whole Network Operations

The instructor lectures about and demonstrates the host/guest machine setup while the students, in a semicircle around the instructor's back, watch operations occur. Each student is given the opportunity to operate the host computer and see how the guest computers appear from the host screen. The step-by-step instructions on how to operate the network (host and guests) are listed on the blackboard where all students can see them when they have their turn at network operations.

The SEND/RECEIVE program in the Network 2 system, is used with the AUTHOR I authoring system and locks out all student station keyboards during the instructional presentation of each lesson. This program can be demonstrated to students. It will be used frequently in the second and third segments of the workshop series and its introduction to students in this lesson is quite appropriate.

SEGMENT I

Lesson 7

TOPIC: Downloading and Modifying CAI Program Response Strings

OBJECTIVE:

To be able to list, modify and reload the string and numeric variable section of CAI programs.

METHODS:

Lecture, demonstration, hands-on experience and question and answer.

MATERIALS:

Project developed CAI program on Vocabulary Building.

EQUIPMENT:

Computer and peripherals.

TIME:

1 hour

Background

Downloading and Modifying CAI Program Response Strings

Each student is to download the Vocabulary Building program which was developed by the project staff. The program is opened so students can see the program structure and add or change data ("words"). This is an opportunity for the student to do very simple authoring by changing the data statements in a program algorithm.

In the process of looking at the program commands and statements, students will ask a lot of questions about program lines, program meaning and the mean/interpretation of BASIC statements, program sequences and algorithms (the details of the program). This affords the instructor with an opportunity to reenforce various previously taught programming skills and perhaps, in some cases, to introduce new skills or more efficient program sequences to students.

SEGMENT I

Lesson 8

TOPIC: Criteria for Assessing Programs

OBJECTIVE:

To identify the criteria one might use in assessing the utility of CAI programs.

METHOD:

Lecture, hands-on experience, question and answer, discussion.

MATERIALS:

Public domain and locally developed unfinished programs relating to the following subject areas:

- Reading comprehension (details, main ideas, sequence, speed reading)
- Structural analysis (prefix, root, suffix, synonyms and antonyms)
- English usage (grammar, spelling, capitalization and punctuation)
- Mathematical functions (addition, subtraction, multiplication and division)
- Mathematical problems (solving problems)
- Foreign language (Spanish, French and Samoan)
- Earth and space science
- Graphics and map reading skills
- Societies throughout the world (compare/contrast)

"A Software Evaluation Guide for the Language Arts", Robert M. Hertz, Calico Journal, June 1984

EQUIPMENT:

Computer and peripherals

TIME:

1 hour

Background

Criteria for Assessing Programs

The primary purpose of this session is to develop standards to apply to participants own and commercially available CAI programs. The materials used are deliberately unfinished to make programming flaws obvious. The disks in use should be a mixture of programs available to every one for group discussion and programs for individual critique. Each student should get to work with and assess four different programs.

Group discussion should focus on format, "user friendliness", error traps, ease of use and pedagogical soundness, e.g. types of exercise, kind and amount of practice, appropriateness of the instruction for the intended audience. Point out the value and or problems the student will encounter in following computer directions for program use.

It is intended that the authors of some of the programs being studied be present to explain what is happening in the listing, what they are trying to accomplish, the current state of development and the problems being encountered. Programming the content for the instructional software (courseware) is the task of the courseware developer. The participants, regular classroom teachers, develop an awareness of the programming tasks, build authoring skills, and ensure that the courseware is entirely consistent with the regular classroom curriculum.

SEGMENT II

Lesson 9

TOPIC: Introduction to the TRS-80 Microcomputer and the Authoring System.

OBJECTIVES:

A. To name and use several parts of the computer.

B. To handle diskettes correctly.

C. To use computer terms in context.

D. To perform basic computer operations including power-up, disk formatting and copying, directory.

E. To name and describe the functions of the five Authoring System modules: TEACH, STUDENT, AUTHOR, PRTVERF and CHAIN.

METHODS:

Lecture by workshop presenter, drill or practice, and hands-on computer usage.

MATERIALS:

Coursework Development with TRS-80 AUTHOR I, Student Manual, pp. 2-8.

Worksheet/Handout #13

EQUIPMENT:

TRS-80, Model III or Model 4
Authoring System Diskettes
Blank Diskettes
Overhead Projector, Screen and Dry Markers
Radio Shack Transparencies for AUTHOR I System

TIME:

Two hours

Background

Introduction to the TRS-80 Microcomputer and the Authoring System

The first lesson is designed to introduce the TRS-80 Model III or Model 4 Computer to adults with no previous computer experience. For many of your students only the briefest of introduction to a new type of computer may be necessary. Take a moment to assess students' previous experiences and adjust lesson content and timing accordingly.

Do not underestimate the importance of diskette handling. Both new and old computer users may have a tendency to mishandle diskettes.

Teaching the orderliness of procedures is critical to later student success and to minimizing data loss through procedural mistakes. The importance of periodic backup should be stressed. Use of the DIR (directory) functions to determine file size will alleviate possible disk overflow problems which can occur later.

A major goal in this introductory session is to learn how the file authoring modules function as a unit. How they "work together" defines what the user can do with the authoring system.

The workbook materials require rote responses. If your students are uncomfortable with this technique, you can change the workbook activity from an individual to a group response or supplement with another review technique.

In defining basic computer operations insure that the students understand the concepts of INPUT, OUTPUT, PROCESSING, STORAGE, MEMORY, and CONTROL FUNCTIONS.

SEGMENT II

Lesson 10

TOPIC: Introduction to the AUTHOR I System.

OBJECTIVES:

A. To review the major outcomes of the previous day's lessons.

B. To learn the general structure of the AUTHOR I authoring system.

C. To learn the meaning of basic terms used in the AUTHOR I authoring system.

D. To load the AUTHOR I program used to create a lesson and experience a lesson.

E. To learn special keys and features of the authoring system sample student lesson.

METHODS:

Lecture by workshop presenter, drill or practice, and hands-on computer usage.

MATERIALS:

Coursework Development with TRS-80 AUTHOR I, Student Manual, pp. 12-21.

Worksheets/Handouts #14, #15, #16, and #17

EQUIPMENT:

TRS-80, Model III or Model 4
Authoring System Diskettes
Blank Diskettes
Overhead Projector, Screen and Dry Markers
Radio Shack Transparencies for AUTHOR I System

TIME:

Two hours

Background

Introduction to the AUTHOR I System

The following terms are defined in this lesson: "author," "software," "courseware," "authoring tool," "programming," "authoring language," "authoring system," "data field," and "menu." Some of these terms may have conflicting meanings for students and their precise use in the context of this system should be stressed. Verify that students understand these terms before loading the AUTHOR I program.

Emphasize what each of AUTHOR I's five modules or command programs does:

- AUTHOR creates (and edits) lesson
- TEACH presents a lesson
- PRTVERF prints a lesson
- STUDENT keeps score on a lesson (stores student records)
- CHAIN branches outside a lesson (links the authoring system to other programming language routines).

The hands-on experiences provided by the activities in lesson two (loading the sample lesson, taking the lesson and trying special keys and functions) reinforce the vocabulary of this lesson. It is important that these hands-on activities be successful for students. Observe the students carefully for any difficulties; encourage exploration, assure the students that they can't make any serious errors or damage programs or equipment.

SEGMENT II

Lesson 11

TOPIC: Structure of the AUTHOR I "Lesson."

OBJECTIVES:

A. To define and use in context the terms "frame," "display," "page," "lesson," "lesson file name," and "lesson length."

B. To define and describe the use of "text," "question," "glossary," and "control" pages.

C. To enter and exit the ADD menu.

D. To develop a flow chart (or plan) for a lesson.

METHODS:

Lecture by workshop presenter, drill or practice, and hands-on computer usage.

MATERIALS:

Coursework Development with TRS-80 AUTHOR I, Student Manual, pp. 24-35.

EQUIPMENT:

TRS-80, Model III or Model 4
Authoring System Diskettes
Blank Diskettes
Overhead Projector, Screen and Dry Markers
Radio Shack Transparencies for AUTHOR I System

TIME:

Two hours

Background

Structure of the AUTHOR I "Lesson"

A clear understanding of the terms used in this lesson is essential to later progress. In particular the types of "pages" are likely to cause some confusion for the beginning student; e.g., the "question" page doesn't ask the question, it specifies the correct answer. The "control" page will only make sense to the experienced user - explain the type briefly and move on.

Activity 3, Part I requires detailed information. The activity should be supplemented by lecture and demonstration in which the instructor takes the class through each question. Insure that every student understands the reason for the number of pages of each type required.

Activity 3, Part II is a very formal exercise that can become an end in itself. Do not allow this to happen. Help students through the exercise quickly.

SEGMENT II

Lesson 12

TOPIC: TEXT Page: Text Entry and Editing, Part I.

OBJECTIVES:

A. To describe the three primary purposes of the TEXT page, entries that can be made on a TEXT page and the data fields that can appear on a TEXT page, and define the terms "label," "cursor," and "editing."

B. To use the TRS-80 in creating and editing a TEXT page.

METHODS:

Lecture by workshop presenter, drill or practice, and hands-on computer usage.

MATERIALS:

Coursework Development with TRS-80 AUTHOR I, Student Manual, pp. 38-54.

Worksheets/Handouts #18 and #19.

EQUIPMENT:

TRS-80, Model III or Model 4
Authoring System Diskettes
Blank Diskettes
Overhead Projector, Screen and Dry Markers
Radio Shack Transparencies for AUTHOR I System

TIME:

Two hours

Background

TEXT Page: Text Entry and Editing, Part I

Note: Lesson 11 will probably require extensive review. Plan to spend the first 20 minutes of Lesson 12 on a detailed review of the terms and operations introduced in Lesson 11.

Lesson 11 introduces the editing procedures unique to the AUTHOR I system. There are a great number of special keys and sequences to add, delete, modify and move text. These are best taught by a combination of lecture, demonstration and hands-on experience. Proceed in a step-wise fashion; introducing demonstrating and practicing each concept with the students. After the first two or three keys, provide review incorporated with each new concept. Use the workbook materials after the hands-on experience.

Much of this lesson requires familiarity with the keyboard. Plan to allow time for students to explore the required shifted and double shifted key sequences.

SEGMENT II

Lesson 13

TOPIC: TEXT Page: Text Entry and Editing, Part II.

OBJECTIVES:

A. To describe the three primary purposes of the TEXT page, entries that can be made on a TEXT page and the data fields that can appear on a TEXT page, and define the terms "label," "cursor," and "editing."

B. To use the TRS-80 in creating and editing a TEXT page.

METHODS:

Lecture by workshop presenter, drill or practice, and hands-on computer usage.

MATERIALS:

Coursework Development with TRS-80 AUTHOR I, Student Manual, pp. 50-57.

Worksheets/Handouts #20 and #21.

EQUIPMENT:

TRS-80, Model III or Model 4
Authoring System Diskettes
Blank Diskettes
Overhead Projector, Screen and Dry Markers
Radio Shack Transparencies for AUTHOR I System

TIME:

Two hours

Background

TEXT Page: Text Entry and Editing, Part II

This is a continuation of the previous lesson. Since a lot of new information was presented in that lesson, review it carefully.

Continue to combine lecture, demonstration and hands-on methods to introduce each new operation and key sequence. Provide review and practice after each new editing operation.

The "Part II" activity in the workbook (pp. 55-57) summarizes all editing operations as well as saving a lesson. Watch student performance carefully. Where confusion is evident, provide review explanations.

SEGMENT II

Lesson 14

TOPIC: TEXT Page: Text Entry and Editing Graphics and Special Characters.

OBJECTIVES:

A. To identify and describe the purpose of the three graphics modes and Special Characters.

B. To identify the available graphics operations and special characters and use them to augment a TEXT page.

METHODS:

Lecture by workshop presenter, drill or practice, and hands-on computer usage.

MATERIALS:

Coursework Development with TRS-80 AUTHOR I, Student Manual, pp. 60-74 and pp. 77-85.

Worksheet/Handout #22.

EQUIPMENT:

TRS-80, Model III or Model 4
Authoring System Diskettes
Blank Diskettes
Overhead Projector, Screen and Dry Markers
Radio Shack Transparencies for AUTHOR I System

TIME:

Two hours

Background

TEXT Page: Text Entry and Editing Graphics and Special Characters

The concept and use of graphics as opposed to character oriented screens may be unfamiliar to most of your students. Explain the notion of pixels and pixel control carefully. Note especially those points at which graphics control is different from character control, e.g. diagonal cursor movement, coordinates and modes.

Acquisition of graphics control is usually straight forward. Describe and demonstrate each operation before having students practice it. Provide frequent review.

The Special Characters section should provide little difficulty. Be sure to introduce the special character mode after graphics are well practiced. This will serve to break any tendency to confuse regular and special character control as well as provide some introduction to the multiple key and double shifted sequences.

SEGMENT III

Lesson 15A

TOPIC: Review of Prior Workshop Segment: II. Authoring System.

OBJECTIVES:

A. To practice calling DIR, loading AUTHOR program, and interpretation of different menus.

B. To review previously learned authoring material.

METHODS:

Lecture by workshop presenter, drill or practice, and hands-on computer usage.

MATERIALS:

Coursework Development with TRS-80 AUTHOR I, Student Manual, pp. 2-85.

EQUIPMENT:

TRS-80, Model III or Model 4
Authoring System Diskettes
Blank Diskettes
Overhead Projector, Screen and Dry Markers
Radio Shack Transparencies for AUTHOR I System

TIME:

One and one-half hours

Background

Review of Prior Workshop Segment: II. Authoring System

The first lesson is designed to review workshop segment II in this three segment series. As originally implemented, this segment followed segment II in the series by several (five) weeks. As with any newly acquired set of complex intellectual and motor skills considerable forgetting can take place in the interim between segments. For this reason the review session is particularly critical to the remainder of the workshop. For some students only a brief review may be necessary, for others much critical information has been forgotten. Take a moment to assess each student's previous experiences and adjust lesson content and timing accordingly. Such individual assessment should focus on ability to apply rather than to recall rote content.

For those requiring fairly extensive review the following sequence is suggested. Provide a brief overview in lecture format of the major functional concepts covered in segment II. These should include at least: the five command programs, editing text, inserting and deleting, graphics and special characters application. Following this brief overview, each of the major and subordinate concepts should be reviewed in some detail. Emphasis should be placed on the operational characteristics of the concept; i.e., how it is implemented, what are the areas of application, how does it interact with other concepts. A combination of lecture with question-and-answer is effective here. Finally, hands-on practice with specific concepts and details should be used. Depending upon the level of the class, it may be desirable to have students practice groups of operationally related concepts rather than practicing

concepts in isolation. Hands-on practice should include: calling DIR, loading AUTHOR program and interpretation of different menus. A good way to summarize and reinforce these concepts is to have each workshop participant do a sample lesson.

Do not underestimate the importance of diskette handling. Both new and old computer users may have a tendency to mishandle diskettes.

Teaching the orderliness of procedures is critical to later student success and to minimizing data loss through procedural mistakes. Reinforce this concept. The importance of periodic backup should be re-stressed.

SEGMENT III

Lesson 15B

TOPIC: The QUESTION Page: ANSWER Portion

OBJECTIVES:

A. To correctly interpret the QUESTION page symbol.

B. To name and identify the functions of the two "sides" of a QUESTION page and explain the terms "input" and "feedback."

C. To differentiate between the three types of ANSWERS in the AUTHOR I system.

D. To construct the data fields on the ANSWER portion of a QUESTION page.

E. To identify and apply the characteristics of acceptable alternative answers in constructed response format items.

METHODS:

Lecture by workshop presenter, drill or practice, and hands-on computer usage.

MATERIALS:

Coursework Development with TRS-80 AUTHOR I, Student Manual, pp. 88-100 and 105-108.

EQUIPMENT:

TRS-80, Model III or Model 4
Authoring System Diskettes
Blank Diskettes
Overhead Projector, Screen and Dry Markers
Radio Shack Transparencies for AUTHOR I System

TIME:

One and one-half hours

Background

The QUESTION Page: ANSWER Portion

The following terms are defined in this lesson: "input," "feedback," "answer: field," "default," "max. tries," "factors," "weight: field," "variables," "group: label," "answer label: field," "positive message," and "negative message." Some terms may have different meanings for students and their precise use in the context of this system should be stressed. Always verify that a student understands a particular term.

The concepts covered in this section are generally straight forward. Students have little difficulty in mastering them. The only precaution worthy of note relates to the concept of "weighting." Although the practice of assigning variable weights to different items in a test is frequently encountered it has been established to be a psychometrically unsound practice. Students should be encouraged to use the weighting option carefully and sparingly.

In discussing the criteria for answer judging of constructed response answers students should be cautioned to apply the same criteria that they ordinarily use in developing paper-and-pencil classroom tests, i.e., the kinds of alternate vocabulary likely to be used to describe the learning outcome where the learning emphasis is not on "rote" memorization.

The workbook materials require rote responses. If your students are uncomfortable with this technique, you can change the workbook activity from an individual to a group response or supplement with another review technique.

The hands-on experiences provided by the activity in this lesson reinforce the vocabulary. It is important that the hands-on activity be successful for students. Observe the students carefully for any difficulties; encourage exploration, assure the students that they can't make any serious errors or damage programs or equipment.

As originally implemented, only Part 2 of "Lesson 7" was used. This strategy effectively saves 20 to 30 instructional minutes. The student loses nothing so long as definitions of the editing keys are provided. Alternatively, if time permits, addition of Part 1 will provide supplemental practice.

SEGMENT III

Lesson 16A

TOPIC: Introduction to the QUESTION Page: HINTS Portion

OBJECTIVES:

A. To learn the two broad categories of HINTS - "Tries" and "Triggered."

B. To identify and apply the three types of HINTS in context: "On-Page," "Reference," and "Hint Sequence."

C. To reference labels on TEXT pages which have been placed to identify hint messages.

D. To explain the AUTHOR I hierarchy governing the display of feedback and HINT messages.

METHODS:

Lecture by workshop presenter, drill or practice, and hands-on computer usage.

MATERIALS:

Coursework Development with TRS-80 AUTHOR I, Student Manual, pp. 110-115.

EQUIPMENT:

TRS-80, Model III or Model 4
Authoring System Diskettes
Blank Diskettes
Overhead Projector, Screen and Dry Markers
Radio Shack Transparencies for AUTHOR I System

TIME:

One and one-half hours

Background

Introduction to the QUESTION Page: HINTS Portion

This is the first of a two-part lesson. In this first portion the basic ideas to the HINTS portion of the QUESTION page are explained and summarized. In field trial and experience the lesson division proved necessary because (1) the HINTS page concepts present some difficulties to students and (2) it may be expedient to allow some time at the beginning of this session for students to complete the exercise in Lesson 15B. (Ordinarily about half a class may need an additional 15 minutes to complete the exercise started on the previous day.)

The major stumbling block encountered by students in this lesson is the concept and practice of labels for "reference hints" and correlating the labels with and on TEXT pages. Stressing that the labels serve to identify the beginning and end points of a message for the computer's search routine may help students visualize the process. In any event, experience has shown that the lesson on the CONTROL page (Lesson 18A) will clear up any remaining questions.

SEGMENT III

Lesson 16B

TOPIC: Application of the QUESTION Page: HINTS Portion

OBJECTIVES:

A. To apply the concepts in Lesson 16A and obtain hands-on practice in creating HINT messages.

B. To add labels to TEXT page to identify the location of each HINT message.

C. To apply the hierarchy governing the display of feedback and HINT messages.

METHODS:

Lecture by workshop presenter, drill or practice, and hands-on computer usage.

MATERIALS:

Coursework Development with TRS-80 AUTHOR I, Student Manual, pp. 116-120.

EQUIPMENT:

TRS-80, Model III or Model 4
Authoring System Diskettes
Blank Diskettes
Overhead Projector, Screen and Dry Markers
Radio Shack Transparencies for AUTHOR I System

TIME:

One and one-half hours

Background

Application of the QUESTION Page: HINTS Portion

This is a practice session for the concepts developed in Lession 16A. Since many students may have had difficulty with these concepts, special efforts should be made to provide individualized monitoring of student output.

The quiz on pp. 116-117 is done prior to the activity to reinforce the concepts.

SEGMENT III

Lesson 17A

TOPIC: The GLOSSARY Page

OBJECTIVES:

A. To know the purpose of and to discriminate among the functions of the GLOSSARY page.

B. To review the operational sequence involved in a student's use of a glossary to request a definition.

C. To add to, maintain and edit a GLOSSARY page.

METHODS:

Lecture by workshop presenter, drill or practice, and hands-on computer usage.

MATERIALS:

Coursework Development with TRS-80 AUTHOR I, Student Manual, pp. 136-145.

EQUIPMENT:

TRS-80, Model III or Model 4
Authoring System Diskettes
Blank Diskettes
Overhead Projector, Screen and Dry Markers
Radio Shack Transparencies for AUTHOR I System

TIME:

One and one-half to one and three-quarter hours

Background

The GLOSSARY Page

It is suggested that a review of the QUESTION page occur prior to introducing the GLOSSARY page. At this point in the workshop a number of new concepts have been introduced, which if left unreviewed, could interfere with future learning.

The glossary is basically a dictionary of definitions for words that the teacher anticipates may prove difficult for the student. The procedure for a student requesting a definition should be reviewed as context for the glossary creation activity. Practice in adding, maintaining and editing a lesson GLOSSARY page is essential to the learning process. There are no difficult concepts associated with this lesson or in creating a glossary. Workshop participants find the concept easy to understand. It may be necessary to review, with participants, the various editing functions and key assignments necessary to physically edit and maintain the glossary.

The activity in this lesson includes required knowledge of the CONTROL page. Since this page is not taught until Lesson 18A, students should be advised to skip over tasks associated with the CONTROL page, or the instructor may chose to introduce relevant CONTROL page information which allows completion of the task. In the latter case, the activity with CONTROL page introduction will take approximately 15 minutes longer and the session will last approximately one and three-quarter hours.

The quiz in this lesson (pp. 141-142) is generally given as a review homework assignment to the student, due the next day.

SEGMENT III

Lesson 17B

TOPIC: Reviewing and Editing a Lesson

OBJECTIVES:

A. To apply editing procedures to previously constructed pages.

B. To know how to save a lesson to disk after editing.

METHODS:

Lecture by workshop presenter, drill or practice, and hands-on computer usage.

MATERIALS:

Coursework Development with TRS-80 AUTHOR I, Student Manual, pp. 148-161.

EQUIPMENT:

TRS-80, Model III or Model 4
Authoring System Diskettes
Blank Diskettes
Overhead Projector, Screen and Dry Markers
Radio Shack Transparencies for AUTHOR I System

TIME:

One and one-half to one and three-quarter hours

Background

Reviewing and Editing a Lesson

The student will learn how and when to review pages and practice using the REVIEW/EDIT menu to manipulate a lesson. The concept of searching a desired page by page number and a string of specified characters is introduced in this lesson. Editing includes searching through pages, modifying, deleting and inserting pages and saving changes to disk. There are no difficult concepts or operations involved in this lesson. This lesson does require that the student draw upon many earlier acquired skills. As a consequence, some review and/or prompting may be necessary in individual cases.

The quiz and summary in this lesson (pp. 154-157) are generally given as a review homework assignment to the student due the next class session.

Parts I and II of the activity in this session can be completed by letting the session last for one and three-quarters hours. The activity is straight forward but can be time consuming. The instructor must be aware of how each individual student is progressing on the activity and offer maximum support to those who find it most difficult.

SEGMENT III

Lesson 18A

TOPIC: The CONTROL Page

OBJECTIVES:

A. To introduce the concept of "branching" and describe its relevance to the teaching process.

B. To delineate the various forms of branching and the logical structures used to select among them.

C. To relate the operation of the CONTROL page to the concepts learned.

D. To add and use CONTROL pages to tailor a lesson path to an individual student.

METHODS:

Lecture by workshop presenter, drill or practice, and hands-on computer usage.

MATERIALS:

Coursework Development with TRS-80 AUTHOR I, Student Manual, pp. 122-133.

EQUIPMENT:

TRS-80, Model III or Model 4
Authoring System Diskettes
Blank Diskettes
Overhead Projector, Screen and Dry Markers
Radio Shack Transparencies for AUTHOR I System

TIME:

One and one-half hours

Background

The Control Page

In this hour and a half, the content related to the CONTROL page and an activity connected with it can usually be taught. Applications and reinforcement will occur when the activity is developed and in the student homework assignment which requires lesson review in completing both the lesson summary and quiz.

Depending on the experience of your students with programmed learning concepts, the issues involved in mastering the CONTROL page can prove to be among the more difficult in this workshop series. Many of your students will need to be introduced to the concept of branching as a pedagogical device. The instructor should be prepared with several good examples illustrating the use of branching techniques and distinguishing between differing types of branches: internal versus external, conditional versus unconditional. Mastery of the CONTROL page will also require facility with several logical functions such as: IF....THEN, ALWAYS, AND/OR and equalities and inequalities. Much of the basics to these logical operations were introduced in the first workshop segment "System Introduction." Introduction to BASIC Programming Language I-III of that series contains the fundamentals. Many students may need to be referred back to that material, others will need only cursory reminders of what they have already learned.

Applications and use of CONTROL page techniques is undertaken in the activity done the last half hour of this session. Since this activity can be difficult for some students, the instructor must monitor the activity carefully.

SEGMENT III

Lesson 18B

TOPIC: Presenting a Lesson with the TEACH Program

OBJECTIVES:

A. To review the procedures the student must use in controlling the preservation of lesson material.

B. To practice taking a lesson.

METHODS:

Lecture by workshop presenter, drill or practice, and hands-on computer usage.

MATERIALS:

Coursework Development with TRS-80 AUTHOR I, Student Manual, pp. 178-186.

EQUIPMENT:

TRS-80, Model III or Model 4
Authoring System Diskettes
Blank Diskettes
Overhead Projector, Screen and Dry Markers
Radio Shack Transparencies for AUTHOR I System

TIME:

One and one-half hours

Background

Presenting a Lesson with the TEACH Program

This lesson is primarily review: the simulated taking of a lesson. The role of the TEACH program in the AUTHOR I system is explained by the instructor. The student practices taking a lesson. The significance of the CONTINUATION symbol as well as review capability within a lesson are examined. The three types of answers in AUTHOR I are discussed. How the computer judges these answers is detailed. Exits from a lesson which occur before (early) and upon its completion are also covered in this session.

Application of this lesson, lesson activity Part I and Part II, pp. 185-186, is accomplished in the last half hour of this session. This activity is critical to a thorough understanding of what it feels like to take a lesson, how a student might perceive a lesson when questions are understood and answered correctly and when they are not understood and answered incorrectly, and the variety and flexibility available within a lesson to both the lesson creator and the lesson user.

At this point the student should evaluate the lesson developed for his/her class. A final run through of the lesson, before presenting the lesson to one's students, will allow the participants to find any remaining errors or mistakes in his/her programming.

SEGMENT III

Lesson 19A

TOPIC: Using the PRTVERF Program

OBJECTIVES:

A. To learn how to connect a line printer to the microcomputer.

B. To use PRTVERF to print a "hard copy" of a lesson.

C. To use PRTVERF to verify the use of labels in a lesson (interpret the listing produced).

D. To describe the function and meaning of several "reference codes" and "error codes."

METHODS:

Lecture by workshop presenter, drill or practice, and hands-on computer usage.

MATERIALS:

Coursework Development with TRS-80 AUTHOR I, Student Manual, pp. 164-175.

EQUIPMENT:

TRS-80, Model III or Model 4
Authoring System Diskettes
Blank Diskettes
Printer
Overhead Projector, Screen and Dry Markers
Radio Shack Transparencies for AUTHOR I System

TIME:

One and three-quarters to two hours

Background

Using the PRTVERF Program

Connection of the line printer to the computer presents no difficulties for the student if it is presented methodically and students are given the opportunity to practice the learned skill. Printers must be available for this lesson if the lesson is to be an effective learning experience for students. The instructor should prepare for this lesson by practicing installation of the printer following the manufacturer's directions. Special attention should be paid to making sure all the power is off during the installation process, making sure the cable is connected to the proper port on the computer and the proper path is free of obstructions.

The content in this lesson can present much difficulty to the student. The concept of "reference codes" (there are 8 in the AUTHOR I System) and "error codes" (there are 3 in the AUTHOR I System) must be carefully explained to the student. Likening the code symbols to word abbreviations or shorthand will help in their comprehension. Understanding the concept involved is much more important to the student than any rote memorization of specific code symbols.

Use of the PRTVERF (Print/Verify) program to print a hard copy of a lesson and for verifying its labels is otherwise straight forward. The quiz and summary within the lesson should be completed by the student as review and reinforcement exercises after the activity has been completed.

Background

Using the PRTVERF Program

Connection of the line printer to the computer presents no difficulties for the student if it is presented methodically and students are given the opportunity to practice the learned skill. Printers must be available for this lesson if the lesson is to be an effective learning experience for students. The instructor should prepare for this lesson by practicing installation of the printer following the manufacturer's directions. Special attention should be paid to making sure all the power is off during the installation process, making sure the cable is connected to the proper port on the computer and the proper path is free of obstructions.

The content in this lesson can present much difficulty to the student. The concept of "reference codes" (there are 8 in the AUTHOR I System) and "error codes" (there are 3 in the AUTHOR I System) must be carefully explained to the student. Likening the code symbols to word abbreviations or shorthand will help in their comprehension. Understanding the concept involved is much more important to the student than any rote memorization of specific code symbols.

Use of the PRTVERF (Print/Verify) program to print a hard copy of a lesson and for verifying its labels is otherwise straightforward. The quiz and summary within the lesson should be completed by the student as review and reinforcement exercises after the activity has been completed.

SEGMENT III

Lesson 19B

TOPIC: Creating a Score File with the STUDENT Program

OBJECTIVES:

A. To use the STUDENT program to enroll students in a lesson score file.

B. To predict disk space needed in a score file.

C. To limit or control user access to a lesson.

D. To specify data fields on individual student records.

E. To request individual student scores and timings and produce printouts of cumulative scoring data.

METHODS:

Lecture by workshop presenter, drill or practice, and hands-on computer usage.

MATERIALS:

Coursework Development with TRS-80 AUTHOR I, Student Manual, pp. 188-205.

EQUIPMENT:

TRS-80, Model III or Model 4
Authoring System Diskettes
Blank Diskettes
Overhead Projector, Screen and Dry Markers
Radio Shack Transparencies for AUTHOR I System

TIME:

Two to two and one-half hours

Background

Creating a Score File with the STUDENT Program

This is the last lesson in the workshop series and it is a culmination of not only this segment but the two previous segments as well. The session will therefore be a bit longer than any other session in the series. Be sure to allow time for a final summary at the end of the session (10 minutes) recapitulating how far students have come since they started each of the three series of sessions. This lesson demands much discussion and interaction between instructor and students. Students may have some difficulty with the calculation of disk storage space needed (the size of a score file). Though the absolute maximum number of enrollees is the score file for a lesson is 99, the space available on any given lesson diskette may be less than this maximum. The calculations necessary are not difficult-- they must however be done accurately and methodically. The instructor should monitor students carefully and make sure they understand how to do the calculation.

Workshop participants should have no difficulty enrolling students in a lesson score file or limiting or controlling user access to a lesson.

Using the programs to request individual student scores and timings and to produce printouts of cumulative scoring data are not difficult. Wise interpretation of the data received is another matter. Participants need practice in interpreting the meaning of a particular printout. Workshop participants should be cautioned to look at all student responses to a given item before attempting to interpret the responses of any one student. This will increase the likelihood that

problems inherent in the structure of each item will be caught before the item influences the description of student learning.

Specifying data fields on individual student records, subscores and subtimings, which are determined on the same file's master page, take a great deal of thought as well. Determining if specific answers to questions should be recorded for a particular lesson (there is a limit of two) must be based on pedagogical considerations and sound testing principles. The score file can otherwise be a repository of useless information and a source of confused interpretation rather than a means of ascertaining student and group progress and lesson effectiveness.

The summary and quiz in this lesson can be done (if time allows) as a review and reinforcement exercise after the completion of Part I and Part II of the activity in the lesson. The activity presents valuable hands-on experience to the student and allows the student to integrate the prior learning and discussion more thoroughly than lecture and discussion could do alone.

APPENDICES

APPENDIX A

Worksheets/Handouts Nos. 1 - 12 (Segment I)
Worksheets/Handouts Nos. 13 - 22 (Segment II)

Worksheet/Handout #1 Name _____
Computer Programming

Follow the directions on each of the following:
Remember to press return (<cr> means return after each entry).

enter PRINT "HELLO" <cr> What happened? _____

enter PRINT HELLO <cr> What happened? _____

enter PRINT " " <cr> What happened? _____
(enter your own name between these quotes)

enter 3 * 4 <cr> What happened? _____

enter ? 3 * 4 <cr> What happened? _____

enter PRINT 3 * 4 <cr> What happened? _____

enter PRINT " 3 * 4 " <cr> What happened? _____

enter PRINT " 3 * 4 " <cr> What happened? _____

enter ? " 3 * 4 = " 3 * 4 <cr> What happened? _____

enter HOME <cr> What happened? _____

enter LIST <cr> What happened? _____

enter NEW <cr>
enter 10 PRINT " " <cr>
(your name)

enter 20 GOTO 10 <cr>

enter RUN <cr> What's happening? _____
Press reset button.

enter HOME <cr> (Apple) [CLS (TRS-80)]

enter LIST <cr> What happened? _____

enter HOME <cr>

enter LIST 10 <cr> What happened? _____

enter HOME <cr> What happened? _____

enter 5 HOME <cr> What happened? _____

enter RUN <cr> What happened? _____
Press reset button.

enter HOME <cr> What happened to
statement 5? _____

enter LIST <cr>

Worksheet/Handout #2 Name _____
String Variables

```
enter: NEW
each
of      20  A$ = " MATH "
these   30  B$ = " IS "
lines   40  C$ = " FUN "
        50  PRINT A$
        60  PRINT B$
        70  PRINT C$
        80  END
enter: RUN
```

Tell what is printed: _____

```
enter: LIST
```

Tell what was printed: _____

```
enter: 50  PRINT A$ + B$ + C$

enter: 60  (press return)

enter: 70  (press return)

enter: RUN
```

Tell what is printed: _____

```
enter: LIST
```

How does this list differ from the first list you entered? _____

What happened to statement 60 and 70?

_____

```
enter: NEW

enter: LIST
```

What is printed now? _____

```
enter: 10  HOME
       20  A$ = 5

enter: 30  PRINT A$

enter: RUN
```

What happened when you tried to enter a number for A$? _____

```
enter: 20  A = 5
       30  PRINT A
```

What do variables like A$, B$, T$ represent in this computer? _____

Worksheet/Handout #3 Name _____
String Variables

Enter each of the following programs just as they are and record briefly what happens after each Immediate Execution.

```
NEW
10  A$ = " THIS "
20  B$ = " IS "
30  C$ = " A "
40  D$ = " TEST "
60  PRINT A$, B$, C$, D$ : ?
70  PRINT A$ ; B$ ; C$ ; D$  : ?
80  PRINT A$ ; "  " ; B$ ; "  " ; C$ ; "  " ; D$ : ?
90  PRINT A$ + B$ + C$ + D$ : ?
100 PRINT A$ + "  " + B$ "  " + C$ "  " + D$ : ?
110 PRINT " HOW DO THESE PRINT STATEMENTS DIFFER ?"
120 END
```

```
NEW
20  INPUT " ENTER YOUR NAME " ; N$
30  INPUT " ENTER YOUR FAVORITE SPORT " ; S$
40  INPUT " ENTER YOUR FAVORITE SUBJECT " ; C$
50  INPUT " ENTER YOUR AGE " ; AGE
70  PRINT " HI !! AREN'T YOU " N$ ".  I THOUGHT I RECOG-
    NIZED YOUR TOUCH."
80  PRINT " YOU DON'T LOOK A DAY OVER " AGE " YEARS OLD
    TO ME."
90  PRINT " YOU MUST SPEND A LOT OF TIME PLAYING " S$ " IN
    YOUR SPARE TIME."
100 PRINT " YOU HAD BETTER SPEND MORE TIME STUDYING " C$ "
    OR YOU WILL BE AS{DUMB WHEN YOU ARE" AGE + 1 " AS
                     {SMART
    YOU ARE NOW!!"
110 END
RUN
```

Worksheet/Handout #4
Assignment Statements
(Real Variables)

Name _____

Read through each of these sample programs. The output will appear on the screen if each of these programs is run.

I)
```
NEW
10  A = 100
20  B = 44
30  PRINT A + B
40  PRINT A - B
50  PRINT A * B
60  PRINT A / B
```
OUTPUT
```
144
56
4400
2.27272727
```

II)
```
NEW
10  A = 100
20  B = 44
30  PRINT A + B , A - B , A * B , A / B
```
OUTPUT
```
144   56   4400
2.27272727
```

III)
```
NEW
10  A = 100
20  B = 44
30  PRINT A + B ,
40  PRINT A - B ,
50  PRINT A * B ,
60  PRINT A / B
70  END
```
OUTPUT
```
144     56     4400
2.27272727
```

IV)
```
NEW
10  A = 13
20  B = 7
30  C = A + B
40  PRINT A, B, C
```
OUTPUT
```
13          7          20
```

V) Write a program using 3 variables (letters) and has this output:

```
6          9          54
```

VI) Write a program which will add, subtract, divide, and multiply two numbers A and B. You set the numbers A and B. Have your program print each answer on a different line.

Worksheet/Handout #5
INPUT

Name _____

Type this. Press RETURN after each line.	Record what happens below.
NEW 10 PRINT " HOW WAS YOUR DAY"; 20 INPUT D$ 30 PRINT " MY DAY WAS " D$ " TOO." 40 END RUN (Leave spaces)	
RUN (again only use different answer)	
NEW 10 PRINT " HOW MANY DAYS UNTIL VACATION"; 20 INPUT V 30 PRINT V " DAYS IS A LONG TIME." 40 END RUN (Leave space)	
RUN (again using a different number)	

INPUT lets you change what happens each time a program is run. It lets you talk to the Apple and give it information it needs to finish running your program.

If you want a person running the program to answer with a word you use any letter A through Z followed by a $.

EXAMPLES:

INPUT C$ or INPUT K$ or INPUT G$

If you want the person running the program to answer with a number you use any letter A to Z.

EXAMPLES:

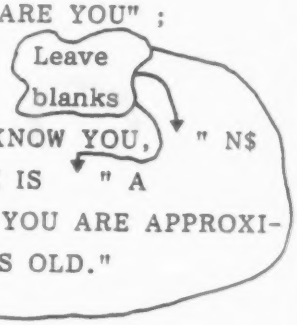
INPUT D or INPUT H INPUT NUMBER

Once we answer the computer, the computer will use our answer rather than the letter or letter and $ in the running of the program. INPUT is very useful in programming because it makes a computer program more general in its use.

Worksheet/Handout #6
PRINT, INPUT, HOME

Name_____

Type this. Press RETURN after each line.	Record what happens.
NEW 40 PRINT " WHAT IS YOUR NAME" ; 50 INPUT N$ 60 PRINT " HOW OLD ARE YOU" ; 70 INPUT A 80 D = A * 365.25 110 PRINT " NICE TO KNOW YOU, " N$ 120 PRINT " YOUR AGE IS " A 130 PRINT " THAT IS, YOU ARE APPROXI- MATELY " D " DAYS OLD." 900 END RUN (for each person at your APPLE or TRS-80.)	
10 HOME LIST	
RUN (at least two more times)	
SAVE DAYS CATALOG	



LOAD DAYS
LIST

Type lines 80 and 130 in again changing them to make the computer print out your age in hours. Record how you changed lines 80 and 130 below.

80

130

Worksheet/Handout #7 Name_____
IF - THEN

```
NEW
10   ? "GUESS WHAT SCHOOL I AM FROM."
20   ? "HERE ARE YOUR CHOICES:"
30   ? "_____, _____, _____"
     (Put in the names of 3 schools, including yours.)
40   ? "WHAT IS YOUR GUESS"
50   INPUT A$
60   IF A$ = "_____" THEN 90
     (Put in your school's name in this blank)
70   PRINT "GUESS AGAIN !!"
80   GOTO 10
90   PRINT "GOOD GUESSIN' !!!"
100  END
RUN (answer correctly)
RUN (answer incorrectly and then correctly)

SAVE GUESS
CATALOG
```

QUICK QUIZ !!

1) What does NEW do?

2) What is the difference between INPUT A$ and INPUT A?

3) What does HOME do?

4) What does GOTO do?

5) What does the IF - THEN seem to do?

Worksheet/Handout #8
GOTO and IF____THEN____

Name_____

Enter the following:	Record what happens:
NEW 10 PRINT "THIS PROGRAM COUNTS" 20 A = 0 30 ? A 40 A = A + 1 50 GOTO 30 60 END RUN (press control ⟨CTRL⟩ and type C to stop program)	
What does the computer do at line 30? What does the computer do when it gets to line 50? Try this same program with these changes: 40 A = A + 2 LIST RUN (again press CTRL and type C to stop program)	
ENTER	
LIST 35 IF A = 15 THEN 60 40 A = A + 1 RUN LIST How many numbers were printed out? Change statement 35 so that 25 numbers are printed. RUN Change statement 35 so that 135 numbers are printed out. RUN	

Worksheet/Handout #9 Name_____
GOTO and IF-THEN

1) enter

```
NEW
10   PRINT "I'M COUNTING AGAIN"
15   A = 0
20   PRINT A
25   IF A = 25 THEN 50
30   A = A + 1
40   GOTO 20
50   END
RUN
```

Each time the computer gets to line 25, it checks to see if the last number it printed was 25. If it was, it sends the computer to line 50 and stops. If it was not, it goes back to line 20 and prints the next value of A.

2) Change line 25 to:

```
25 IF A> 20 THEN 50
RUN
```

What happened?_____

The following are phrases allowed in an IF-THEN statement:

<	less than
>	greater than
=	equal to
<>	not equal to
<=	less than or equal to
>=	greater than or equal to

Worksheet/Handout #10 Name_____
INPUT With a Message

Whenever you use an INPUT statement in a program, the Apple computer automatically prints a question mark (?) and waits for you to answer. Before each INPUT in a program, it is a good idea to have a PRINT statement. This PRINT statement should ask the question you want answered in the INPUT or describe the kind of information the computer needs in order to go on with the program.

Try typing this:

```
NEW
10   HOME [CLS]
20   INPUT X$
30   PRINT X$ "WAS A GOOD ANSWER."
40   END
RUN (Type in anything you want when you see the "?".)
```

Now add a line by typing:

```
15   PRINT "WHAT IS YOUR WORD"
RUN (Answer the question.)
```

Isn't this an easier program to use?____

Now change line 15 by typing:

```
15   PRINT "WHAT IS YOU WORD"; (Don't forget the semicolon!)
RUN
```

Do you like the question mark by the question better?_____

Try typing this:

```
NEW
10   HOME [CLS]
20   PRINT "WHAT IS YOUR NAME"; (Don't forget the semicolon!)
30   INPUT N$
40   PRINT "HOW OLD ARE YOU"  (Don't use a semicolon!)
50   INPUT A
60   END
RUN
```

Questions...

Where is the "?" for WHAT IS YOUR NAME?_____

Where is the "?" for HOW OLD ARE YOU? _____

Why is the question mark for INPUT N$ in line 30 next to the question from line 20?_____

Worksheet/Handout #11 Name _____
One Line INPUT and Message

Since it is so important that you have a message with each INPUT statement...and since you probably get really tired of typing all those PRINT statements...try this "two lines in one" INPUT statement to make life a little simpler...

```
NEW
10  HOME
20  INPUT "WHAT IS YOUR WEIGHT IN POUNDS"; P
30  LET K = P/2.2
40  PRINT P " POUNDS = "K" KILOGRAMS
50  END
RUN
```

Notice this

Don't type a "?" here

Questions...

Did you get a "?" next to the question from line 20? _____

Change line 20 by typing:

```
20  INPUT "WHAT IS YOUR WEIGHT IN POUNDS?"; P
RUN
```

Don't forget the "?"

Now did you get a "?" with your INPUT in line 20? _____

Write a program that asks you for your first name, then your middle name and then your last name. Use the INPUT with a message statement. Once you answer the questions, the program should print out your last name, your first name and your middle name. Write the program below. Type it in and RUN it.

Worksheet/Handout #12
Producing Graphics

Name _____

You can draw pictures on the TRS-80 by using the SET command to light up rectangles on the screen. The screen is divided into 128 columns horizontally (from 0 at the left to 127 at the right edge) and 48 rows vertically (from 0 at the top to 47 at the bottom of the screen). For example,

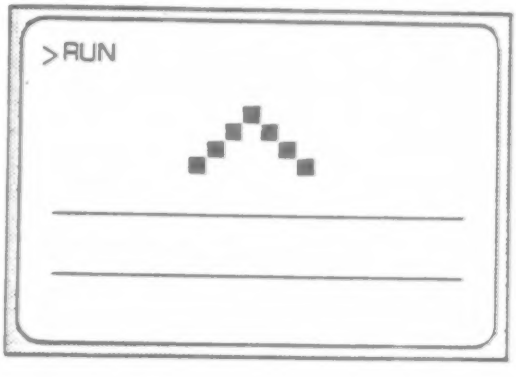
```
60  SET[32,14]
```

lights up (or turns on) the rectangle located 32 columns from the left edge and 14 columns down from the top of the screen;

---------- WRITING OUTPUT ----------

1. Read the program. Then look at the sample screen and fill in the missing output. NOTE: The command CLS clears the whole screen.

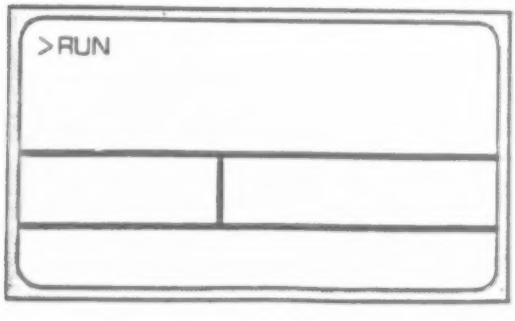
```
10  CLS
20  SET[65,25]
30  SET[64,26]:SET[66,26]
40  SET[63,27]:SET[67,27]
50  SET[62,28]:SET[68,28]
60  SET[63,29]:SET[67,29]
70  SET[64,30]:SET[66,30]
80  END
```



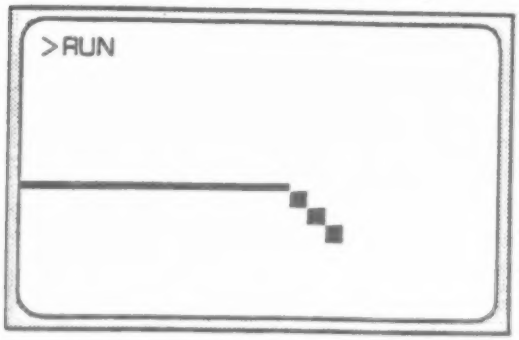
---------- WRITING INPUT ----------

2. Look at the output on the screen. Then read the program and fill in the missing lines. NOTE: Line 90 will repeat itself forever until you press the BREAK key. Using line 90 prevents the READY sign from appearing on the screen until you want it to.

```
10  CLS
20  FOR Y = 20 TO 35
        30  SET[65,Y]
40  _____
50  FOR X = 0 TO 127
60  SET[X,20]
70  _____
80  NEXT X
90  GOTO 90
```

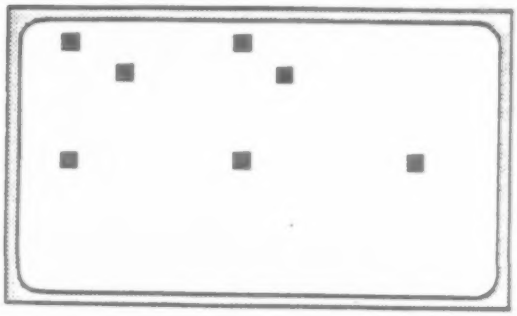


3. Look at the output on the screen. Then read the program and fill in the missing lines. HINT: Remember that lines 60 and 80 make the program pause.



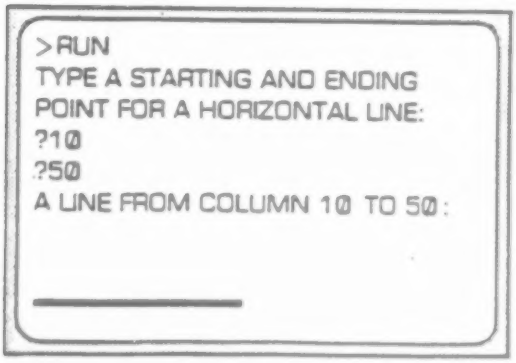

```
10  CLS
20  FOR X = 0 TO 80
30  SET[X,25]
40  _____
50  SET[81,26]
60  FOR P = 1 TO 500:NEXT P
70  _____
80  FOR P = 1 TO 500:NEXT P
90  _____
100 GOTO 100
```

4. Look at the output on the screen. Then read the program and fill in the missing lines.



```
10  CLS
20  DATA 15,5,65,5,25,10,75,10
30  DATA 15,25,65,25,100,25
40  FOR T = 1 TO 7
50  _____
60  SET[X,Y]
70  FOR P = 1 TO 500:NEXT P
80  _____
90  GOTO 90
```

5. Look at the output on the screen. Then write a program that will produce this output. HINT: The line is at row 40 from the top.




```
10  _____
20  _____
30  _____
40  _____
50  _____
60  _____
70  _____
80  _____
90  _____
100 _____
```

HAPPY BIRTHDAY

Here is a little program which will give you more practice in using SET and PRINT @. We call it a HAPPY BIRTHDAY CARD FOR MOTHER. We began this one by sketching the desired birthday card on a TRS-80 Video Worksheet. These worksheets are available from your friendly Radio Shack store. We recommended them - they save lots of time in planning how things will look on the screen.

You, of course, can change the message to MERRY CHRISTMAS, SANTA or HAPPY UNBIRTHDAY,GANDALF or ???

Or change lines 210 and 310, as follows.

```
210  FOR OVER = 0 TO 127 STEP 2
310  FOR DOWN = 0 TO 47 STEP 2
```

Your ability to change this program is, of course, your hallmark of excellence (oops! sorry).

```
100  REM**A BIRTHDAY CARD FOR MOTHER
110  CLS

200  REM**DRAW LINES, TOP & BOTTOM
210  FOR OVER = 0 TO 127
220       SET(OVER, 0)
230       SET(OVER, 47)
240  NEXT OVER

300  REM**DRAW LINES, LEFT & RIGHT
310  FOR DOWN = 0 TO 47
320       SET(0, DOWN)
330       SET(127, DOWN)
340  NEXT DOWN

400  REM**THE HAPPY BIRTHDAY MESSAGE
410  PRINT @347, "H A P P Y";
420  PRINT @473, "B I R T H D A Y";
430  PRINT @603, "M O T H E R";

500  REM**WAIT A BIT, THEN REPEAT
510  T = 2000
520  FOR Z = 1 TO T : NEXT Z
530  GOTO 110
```

Worksheet/Handout #13

INTRODUCTION

The Radio Shack TRS-80 AUTHOR I system is designed to enable any teacher to use the TRS-80 Model III or Model I to create and administer microcomputer-based lessons in any subject. AUTHOR I includes four major modules, each with a different function:

The AUTHOR module is used to create lessons.

The TEACH module is used to present lessons.

The STUDENT module is used to set up and maintain score files.

The PRINT/VERIFY module ("PRTFERF") is used to print a paper copy of the lesson.

To introduce you to TRS-80 AUTHOR I, three "walk-through" sections are included in the "Authoring System for the TRS-80 Manual," pp. 11-53. "How to Take a Lesson" (pp. 11-24) leads you through the process of taking a lesson, using the sample lesson stored on the AUTHOR I diskette as an example. "How to Set up a Score File" (pp. 25-26) outlines the basic steps of setting up and reviewing student score files, again using the sample lesson on the diskette. "How to Create a Lesson" (pp. 37-52) shows you the basics of setting up a simple lesson. The manual is organized to show you how to take a lesson before showing you how to create a lesson. This is to let you see what a completed AUTHOR I lesson looks like, and will make creating a lesson much easier for you.

The second half of the manual is reference material which summarizes the information in each "walk-through" and supplies information on additional features you may want to use.

TRS-80 AUTHOR I can be used with a TRS-80 Model I or Model III 32K or 48K disk system. (48K may be necessary to create longer lessons or to run some purchased lesson programs.)

[Adopted from "Authoring System for the TRS-80 Manual"]
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Worksheet/Handout #14

SPECIAL KEYS AND FEATURES

This handout gives a summary of some of the special keys and features you will need to know to use TRS-80 AUTHOR I. Read the information over carefully before using the program for the first time. Then, after you have learned the basics of using AUTHOR I, refer to these pages as necessary to refresh your memory.

Special Keys and Features are grouped into four sections:

1. General Keys and Features

2. TEACH Module Keys and Features
   (Includes keys and features used by the student when taking a lesson, or by the teacher when taking a lesson as a student would.)

1. General Keys and Features

Keys and Features:	Functions:
■	This flashing box is called a cursor. (On the Model I, the cursor may also be a rectangle or a short line.) When the cursor appears on the screen, it is your turn to enter information into the computer.
ENTER	This key is used to "enter" information into the computer. IN GENERAL, YOU SHOULD PRESS ENTER AFTER YOU HAVE TYPED ANYTHING ONTO THE COMPUTER SCREEN.
TRSDOS Ready	When this message appears on the screen, the computer is ready for you to enter the name of a module (TEACH, STUDENT, AUTHOR, or PRTVERF) or to type another command.

2. Teach Module Keys and Features

These keys and features are used by a student when taking a lesson (or by the teacher when taking a lesson as a student would).

PLEASE NOTE: This section describes the way certain keys work in TRS-80 AUTHOR I lessons. The same keys may have different functions in other TRS-80 computer programs.

Keys and Features:	Functions:
	This large square is called the "continuation symbol." When it is displayed in the lower right corner of the screen, the student can press the space bar once to continue in the lesson.
Space Bar or [↓]	The student can press the space bar or the "down-arrow" key to continue in a lesson when the "continuation symbol" is displayed on the screen.
[ENTER]	In general, [ENTER] should be pressed after typing any kind of information onto the screen (such as the student's name, answers to lesson questions, etc.).
[↑]	The "up-arrow" key is used to return the student to the previous screen in a lesson.
[←]	The "left-arrow" key is used in correcting typing errors. To correct a typing error, backspace with the left arrow key to the beginning of the error and then type over of space over the error.
[BREAK]	The [BREAK] key is used to leave a lesson early (before it has been completed).

NOTE: Most keys on the TRS-80 Model III and Model I will repeat in TRS-80 AUTHOR I if they are held down.

[Adopted from "Authoring System for the TRS-80 Manual"]
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Worksheet/Handout #15

HOW TO USE A LESSON GLOSSARY

1. Student can use [?/] key for a definition of an unfamiliar word. Press key.

   ENTER WORD: Type COURSEWARE (press enter)

   You will get a definition.

   Press [?/] Enter Word: Type MICROCOMPUTER

   You will get this statement, "I do not know this word."

WHAT TO DO AT THE END OF A LESSON

GOODBYE MESSAGE

"YOU'VE REACHED THE END OF SAMPLE."

"GOODBYE!"

PRESS SPACE BAR

You will return to TRSDOS READY.

[Adopted from "Authoring System for the TRS-80 Manual"]
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Worksheet/Handout #16

HOW TO TAKE A LESSON

1. Turn on computer.

2. Wait for red light on disk drive to go out.

3. Insert AUTHOR diskette.

4. Press orange reset button.

5. Display TRSDOS message qualifier.
   Enter date 08/18/84; press Enter.
   IGNORE TIME. Press Enter.

TRSDOS READY Type TEACH SAMPLE Press Enter

(You will see the following)
What is your first name? ____ What is your last name? ____

"WELCOME------STUDENTS!" Press space bar.

You'll learn:

1. "How to move forward to ...to"
   "What to do at the end of a lesson."

   Press SPACE BAR

2. How to move forward in a lesson. (Press space bar or ↓ down arrow key.)

3. How to move back to an earlier screen. (Press ↑ up key.) Try it - remember forward again.

4. How to answer lesson questions.

   a. Student types 1, 2, or 3 or more characters. (What is your first name?)

   b. Student types 1 character (multiple choice, 1, 2, 3, or 4). Who was the first president of the United States?

   (The above are examples of the three types of answers.

[Adopted from "Authoring System for the TRS-80 Manual"]

Worksheet/Handout #17

HOW TO LEAVE A LESSON EARLY

1. Press break key. (You will see the following.)
   a. Using BREAK key type "No" nothing happens.
   b. Using BREAK key type "Yes" allows you to leave.

   PRESS Enter twice to get a Negative message.

   "The correct answer is 3----George Washington." Press BREAK.

   (YOU WILL SEE THIS)

   TRIES HINT

1. Press enter twice, brings cursor to

   Triggers line: (Type 1 and Press Enter) This brings you to

2. Hint: "Oops! Lincoln wasn't the first president!" Press Enter.

3. Triggers line second time: (Type 2 and Press Enter).

   Hint: "Oops! Jefferson wasn't the first president!" Press Enter.

4. Press CLEAR . This brings cursor to top line.

   (Appears after how many tries):

5. Type 01.

   Hint: Type 1, 2, or 3. Press BREAK.

   BACK TO MENU.

6. Type X to exit and press enter.

[Adopted from "Authoring System for the TRS-80 Manual"]

Worksheet/Handout #18

AUTHOR Module Keys and Features

These keys and features are used by the lesson developer when creating or editing an AUTHOR I lesson.

PLEASE NOTE: This section describes the way certain keys work in TRS-80 AUTHOR I lessons. The same keys may have different functions in other TRS-80 computer programs.

Keys and Features:	Functions:
[ENTER]	TEXT Page: One press of the [ENTER] key will move the cursor to the beginning of the next line. When the cursor is on the bottom line of the TEXT page, pressing [ENTER] once moves the cursor to the beginning of the top line. Other Pages: One press of [ENTER] moves the cursor to the next field.
Space Bar	Each press of the space bar leaves one blank space at the current cursor position, erasing any character previously there.
[↑]	TEXT Page: Pressing the up-arrow key moves the cursor up one line. If the cursor is on the top line when the up-arrow key is pressed, it moves to the bottom line. Other Pages: Pressing the up-arrow key moves the cursor to the previous field. If the cursor is in the first field when the up-arrow key is pressed, it moves to the last field.
[↓]	TEXT Page: Pressing the down-arrow key moves the cursor down one line. If the cursor is on the bottom line when the down-arrow key is pressed, it moves to the top line. Other Pages: Pressing the down-arrow key moves the cursor down one field. If the cursor is in the last field when the down-arrow key is pressed, it moves to the first field.

[Adopted from "Authoring System for the TRS-80 Manual"]
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←	Pressing the right-arrow key moves the cursor one space to the right. Pressing the right-arrow key when the cursor is in the last space of a line or field will move the cursor to the beginning of the next line or field.
→	TEXT Page: Pressing the left-arrow key will move the cursor one space to the left. Pressing the left-arrow key when the cursor is at the left margin moves the cursor to the previous line. Other Pages: Pressing the left-arrow key moves the cursor one space to the left within a field's boundaries only.
BREAK	Pressing BREAK records the current page in memory and returns you to the menu. If the current page is the Answer portion of a QUESTION page, pressing BREAK sends you to the Hints portion instead of to the menu.
CLEAR	TEXT Page: Pressing CLEAR moves the cursor to the upper-left corner of the page. Other Pages: Pressing CLEAR moves the cursor to the beginning of the first field on that page.
SHIFT CLEAR	TEXT Page: Pressing SHIFT CLEAR erases the screen from the current cursor position to the end of the screen. Other Pages: Pressing SHIFT CLEAR erases the contents of the field that the cursor is in.
SHIFT Space Bar	Pressing SHIFT Space bar moves the cursor to the next tab stop. There are seven tab stops that are eight characters apart across the screen.
SHIFT ENTER	On a TEXT page, pressing SHIFT ENTER moves the cursor into the margin on the current line.

[Adopted from "Authoring System for the TRS-80 Manual"]
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SHIFT 0

Pressing SHIFT 0 switches the keyboard between upper case only and upper/lower case. The pointer in the left corner indicates the keyboard status. If it is pointing up (↑ or ♠), then all letters typed will be in upper case. If it is pointing down (↓ or ♥), then the keyboard is in upper/lower case mode. Shifted letters will be upper case, unshifted letters will be in lower case.

SHIFT @

TEXT Page: Pressing SHIFT @ switches between the text entry, graphics entry, and special characters entry (Model III only) modes. Text entry mode is denoted by a large blinking cursor, graphics entry mode is denoted by a small blinking cursor, and special characters entry mode is denoted by a large stationary cursor along with the display of special characters at the bottom of the screen.

QUESTION Page: Pressing SHIFT @ creates the "magic bar" character, used in reference hints and in blocking positive messages.

SHIFT ↑

On a TEXT page, pressing SHIFT ↑ deletes the line the cursor is on and moves all the following lines on the page up.

SHIFT ↓

On a TEXT page, pressing SHIFT ↓ deletes the character the cursor is on and moves all characters after the cursor to the left one position. However, if there are two or more spaces after the first character which follows the cursor, then nothing beyond the double spaces is moved.

SHIFT ←

Pressing SHIFT ← deletes the character the cursor is on and moves all characters after the cursor to the left on position. However, if there are two or more spaces after the first character which follows the cursor, then nothing beyond the double spaces is moved.

SHIFT →

Pressing SHIFT → inserts one space at the current cursor position. The character the cursor is on and all characters after the cursor are moved one position to the right. However, if there are two or more spaces after the first character which follows the cursor, then nothing beyond the double space is moved. SHIFT → uses the buffer area in the same way as SHIFT ↓ .

Worksheet/Handout #19

HOW TO CREATE A LESSON

1. Turn on computer.

2. Wait for red light on drive to go out.

3. Insert diskette on bottom drive.

4. You will see "Enter date." Type "01/02/84," press enter.

5. Ignore time. Type "BASIC."

6. Type "AUTHOR PRACTICE," press enter.
   "Is Practice a new lesson?" (Y/N) Type "Y" for yes, press enter.

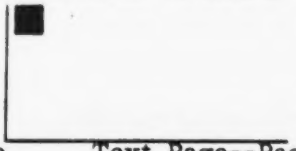
7. Menu (Lesson Development Program)

   A to add pages
   R to review and edit pages
   S to save lesson to disk
   X to exit to TRSDOS

8. Type Enter selection to add pages, press enter menu or press

   O to add a ? page
   G to add glossary page
   C to add a control page
   X to add exit add made

9. Press enter to add a Text Page or



o Text Page--Page #11
↑ or ♠ (upper case)
↓ or ♥ (upper or lower case)

[Adopted from "Authoring System for the TRS-80 Manual"]
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10. Type "1" after enter page #, press enter.

(You will see the following)

Enter page # or press enter for search.

"WELCOME TO PRACTICE LESSON!"
"I HOPE YOU HAVE FUN WITH THIS LESSON."

11. Press "N" for next.

12. Press "E" for exit BREAK BREAK

(You will see the following)

"WOULD YOU LIKE TO SAVE THIS LESSON ON DISK?"

Type "N." Press enter. Disk will spin.

TRSDOS READY

Worksheet/Handout #20

ENTERING TEXT ON A TEXT PAGE

Pressing the up-arrow key (↑) moves the cursor up one line. If the cursor is on the top line when the key is pressed, then it moves to the bottom line.

Pressing the down-arrow key (↓) moves the cursor down one line. If the cursor is one the bottom line when the key is pressed, then it moves to the top line.

Pressing the right-arrow key (→) moves the cursor one space to the right. Pressing the key with the cursor at the right margin moves the cursor to the next line.

Pressing the left-arrow key (←) moves the cursor one space to the left. Pressing the key with the cursor at the left margin moves the cursor to the previous line.

Pressing CLEAR moves the cursor to the home position (top left corner).

Pressing SHIFT CLEAR erases the screen from the current cursor position to the end of the screen.

Pressing SHIFT space bar moves the cursor to the next tab stop. There are seven tab stops that are eight characters apart across the screen.

Pressing SHIFT ENTER moves the cursor into the margin on the current line.

Pressing SHIFT 0 will switch the keyboard between upper case only and upper/lower case. The pointer in the lower left corner indicates the keyboard status. If it is pointing up (♠ or ↑), then all letters typed will be in upper case. If it is pointing down (♥ or ↓), then the keyboard is in upper/lower case mode--shifted letters will be in upper case, unshifted letters will be lower case.

Pressing SHIFT @ switches between the text entry, graphics entry, and special characters entry (Model III only) modes. Text entry mode is denoted by a large blinking cursor, graphics entry mode is denoted by a small blinking cursor, and special characters entry mode is denoted by a large stationary cursor along with the display of special characters at the bottom of the screen.

Pressing SHIFT ↑ deletes the line the cursor is on and moves all the following lines on the page up.

Pressing [SHIFT] [↓] inserts one line before the line the cursor is on and moves all the following lines on the page down. There is a "buffer" area which protects you from losing lines which are moved off the page using [SHIFT] [↓]. This "buffer" area will hold up to one page of information. While adding a new page or editing an existing page, you can temporarily store up to 10 lines of text and graphics. You can retrieve these lines using [SHIFT] [↑]. When adding a new page, if you press [BREAK] to record the page and there is any information in the buffer, then another TEXT page will automatically be created to contain the lines that were left in the buffer. However if you are editing an existing page, then when you press the [BREAK] to record the page, the lines in the buffer will be lost.

Pressing [SHIFT] [←] deletes the character the cursor is one and moves all characters after the cursor to the left one position. However, if there are two or more spaces after the first character which follows the cursor, then nothing beyond the double space is moved.

Pressing [SHIFT] [→] inserts one character in the current cursor position. The character the cursor is on and all characters after the cursor are moved one position to the right. However, if there are two or more spaces after the first character which follows the cursor, then nothing beyond the double space is moved. [SHIFT] [→] uses the buffer in the same way as [SHIFT] [↓]. Characters pushed off the screen into the buffer can be retrieved using [SHIFT] [↑] or [SHIFT] [←].

Pressing the word [BREAK] records the page and returns you to the add mode menu with TEXT as the default page.

Worksheet/Handout #21

SAVING AND STORING LESSONS

1. To save lesson, type "S" and press enter.

   (YOU WILL SEE ON THE SCREEN)

   SAVING LESSON AS PRACTICE O.K.?

   Type "Y" for yes, press enter

   SAVING LESSON ON DRIVE O.K.?

   Type "Y" for yes and press enter

   (YOU WILL SEE ON SCREEN) Disk drive light comes on

   STORING LESSON ON DISK (Main menu reappears)

2. Type "R" for review and edit page. Press Enter.

3. Enter page # or press enter for search.

[Adopted from "Authoring System for the TRS-80 Manual"]
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Worksheet/Handout #22

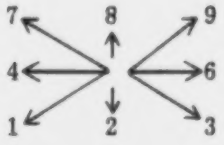
ENTERING GRAPHICS ON TEXT PAGE

To get into the Graphics mode, hold down the [SHIFT] key and press [@]. The cursor will become smaller, and you'll see one of these messages at the bottom of the screen:

- "GRAPHICS MODE: NOT DRAWING" -- means that you can move the cursor without "drawing," or leaving a trail of white.
- "GRAPHICS MODE: DRAWING" -- means that movement of the cursor will leave a trail of white.
- "GRAPHICS MODE: ERASING" -- means that any text or graphics which the cursor crosses will be erased.

To change from one graphics sub-mode to another, press [0] or [.] or [ENTER].

You can move the cursor horizontally or vertically by pressing the arrow key that points in the direction you want the cursor to travel. Holding down [SHIFT] while pressing an arrow key will move the cursor in a straight diagonal line 45 degrees clockwise from the direction of the arrow key you pressed. (Example: [SHIFT] [↑] will move the cursor diagonally up and to the right.) The number keys (across the top of the keyboard and/or on the numeric keypad) will also move the cursor as follows:



The [5] key is inactive.

A press of [SHIFT] [@] will return the Model I user from the graphics mode to normal typing. [SHIFT] [@] advances the Model III user to the special characters mode. Pressing [SHIFT] [@] again returns the Model III user to normal text entry.

NOTES

1. The maximum number of students that can be enrolled in the score file is 99.
2. To view the directory, type DIR at TRSDOS Ready and press enter. This tells you how much free space exists.

[Adopted from "Authoring System for the TRS-80 Manual"]
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ENTERING SPECIAL CHARACTERS ON A TEXT PAGE

Special characters are available only on the Model III. To get into the special characters mode, press [SHIFT] [@] once when you are in the graphics mode or twice when you are in the text mode. The cursor will freeze at its current screen position, and you'll see the special characters display.

To select a special character, type [A] or [B] to identify the row in which the character appears. When the row you didn't select disappears, type the keyboard character that appears above the special character. (If the keyboard character is typed using the [SHIFT] key, be sure to use [SHIFT].)

Each time you finish typing one special character, you'll be returned to the normal typing mode.

USING LABELS IN THE MARGIN OF A TEXT PAGE

There are two types of labels that can be used in the left margin of a TEXT page. You move the cursor to the margin by pressing [SHIFT] [ENTER]. Once in the margin, you can use the up-arrow or down-arrow key to move to the other lines, and the letter, number, and [@] keys to type the label. To return to the text display position of the page, press [ENTER]. Also, if you type four characters or press the left-arrow key four times, you will return to the text display portion of the page.

The first type of label to be used in the margin identifies a portion of text so that the text can be referenced later by QUESTION or CONTROL pages. This type of label ("Text label") consists of from one to four letters and/or numbers. No spaces or symbols are allowed.

The second type of label for use in the margin is the "stop symbol." Normally, a student taking AUTHOR I lesson can backtrack to earlier screens for review. Each press of the up-arrow key will cause the previous screen to appear, except when the current or previous screen includes a question, or the previous page is not a TEXT page. The "Stop" symbol lets you restrict backtracking. The symbol consists of four "@" characters (@@@@) typed onto any line of a TEXT page's left margin. Students can't move back past the Stop symbol.

USING LABELS IN THE TEXT DISPLAY AREA OF A TEXT PAGE

There are seven special labels which can be used in the Text display area of a TEXT page and on QUESTION and CONTROL pages. These labels represent information which is stored on another page, or somewhere else in the computer besides the lesson. These seven labels are:

1. Question Group
2. Answer
3. Date
4. First Name
5. Last Name
6. New Random Number
7. Old Random Number

The question group label stands for the student's score on a particular group of questions. The label is assigned by the lesson developer on the QUESTION page. To display a question group score, type the question group label (as assigned on the QUESTION page) onto the TEXT page between double percent signs in the spot where you want the score to appear. For example:

Congratulations!
Your score for this lesson is
%%LABEL%%.

[Adopted from "Authoring System for the TRS-80 Manual"]
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The answer label stands for the student's response to a particular question. Every question can have a unique answer label if desired. The label is assigned by the lesson developer on the QUESTION page. To display a student's answer, type the answer label (as assigned on the QUESTION page) onto the TEXT page between double ampersands in the spot where you want the answer to appear. For example, if a question asked the student to type his or her name you could reference the answer on a TEXT page as follows:

Hello, &&LABEL1 &&!
Welcome to this lesson !

In this example, extra space is left between the end of the label and the second set of ampersands to make sure that there is plenty of room to display the student's answer. The computer displays as much of the answer as will fit in the space from the first ampersand to the last ampersand. If there is more text on the same line with the label reference, and there is extra space between the ampersands, then the space is closed up. If the answer to be displayed contains more than one word, and if all the words will not fit in the space between the ampersands, then AUTHOR I will display as many complete words of the answer as possible.

NOTE: A question group or answer label cannot be referenced on the same page where it is first assigned.

The date label stands for the date which was entered when the computer was turned on, or when the "ENTER TODAY'S DATE" question was answered. The label is *DT*. To display the date, type the label onto the TEXT page between double ampersands in the spot where you want the date to appear. For example:

Today is &&*DT*&&.

The date will be displayed in the format 02/14/83 for February 14, 1983.

The first name and last name labels can only be used if a score file has been set up for the lesson. These labels stand for the first and last names of the student taking the lesson, as these names appear in the score file. The labels are *FN* and *LN*. Student names are displayed in the same way as today's date. For example:

Hello, $$*FN* && &&*LN* &&!
Are you ready for your lesson today?

You should leave two blank spaces between &&*FN*&& and the closing &&, and seven blank spaces between &&*LN* and the closing &&. If you do not leave these spaces, there will not be room to display the student's name which uses all of the allowed ten characters for the first name and fifteen characters for the last name.

The new random number label stands for a random number between 0 and 255 that is generated by AUTHOR I when the label is used. The label is *NR*. Each time you use *NR*, another random number will be generated.

The old random number label stands for the last random number which was generated. The label is *OR*. Each time a new random number is asked for, the value is automatically assigned to *OR* as well. Unlike *NR*, however, repeated use of *OR* does not change the value of *OR*.

OR and *NR* are displayed in the same manner as *DT*, *LN*, and *FN*. For example:

A new random number is &&*NR*&&.
To repeat, that number was &&*OR*&&.

THE CONTROL PAGE OPTION OF THE ADD MODE MENU

The CONTROL page allows you to transfer or branch students to a different place in a lesson. It also allows branching outside the lesson.

There are two kinds of branches:

- Unconditional branches ALWAYS route the student to the designated place when the lesson reaches the CONTROL page.
- Conditional branches route the student ONLY IF certain conditions are met.

When you select a CONTROL page from the Add Mode Menu, you'll see the following display:

```
ALWAYS:

IF:
This question                is
group or                EQ NE LT
answer label            GT GE LE        this value      and/or

THEN GO TO:
                    CONTROL page--Page #00
```

The control page has three main sections: the "ALWAYS:" section, the "IF:" section, and the "THEN GO TO:" section. If your Branch is unconditional, you complete the "ALWAYS" section. If your branch is conditional, you complete the "IF:" section. The "THEN GO TO:" section is completed for all branches.

TYPING ON A CONTROL PAGE

The special function keys used on the CONTROL page are the same, and have the same functions, as those used on the QUESTION page.

Sections and Fields of the Control Page

The "ALWAYS:" Section

If you want the student to be branched each time the computer reaches this CONTROL page, type an [x] in the "ALWAYS:" field.

The "IF:" Section

If you want the student to be branched only if certain conditions are met, complete the "IF:" section.

The decision of whether or not to branch can be based on several things. For example, the student's score up to the present point in the lesson can be used to branch some students to a remedial section and other students to an advanced section. The information you place in the "IF:" section determines when conditional branching will occur. There are four fields in the "IF:" section as follows:

1. "This question group or answer label"

   This field allows you to tell the computer what to measure. You can fill in this field with any of the following:

   - A question group label (simply type in the label; for example "LABEL1")
   - An answer label (simply type in the label; for example, "LABEL2")
   - *DT*, *FN*, *LN*, *NR*, or *OR*.

2. "is EQ NE LT GT GE LE"

   This field allows you to set up a comparison between the value represented by the label you chose and the value you place in the "this value" field. You can type the abbreviation or the symbol it stands for in the field.

Abbrev.	Symbol	Meaning
EQ	=	Equal to
NE	< >	Not equal to
LT	<	Less than
GT	>	Greater than
GE	>=	Greater than or equal to
LE	<=	Less than or equal to

[Adopted from "Authoring System for the TRS-80 Manual"]

3. "This Value"

Here you place the value that you are comparing the value represented by the label with. What you type here will depend upon what label you used.

If you are using:	Your value will be:
a question group label	a number between 0 and 100, with a percent sign typed after the number. (For example: 100%)
an answer label	an answer to compare the student's answer with. Letters, numbers, spaces, and symbols from the keyboard can be used.
NR or *OR*	a number to compare the random number with. The number must be three digits. For example, 5 would by typed in as "005" and 25 would be typed in as "025". Random numbers range from 0 to 255.
DT	a date, in the form MM/DD/YY. The date must be typed in using two digits each for the month, day, and year, with a slash between each pair. For example, [0] [1] [/] [0] [1] [/] [8] [3] represents January 1, 1983.
FN or *LN*	the literal first name or last name that you want to compare.

4. "and/or"

This field is used only when your conditional branch is based on two conditions. If you want the student to be branched if both conditions are met, type "and" into the field. If you want the student to be branched if either condition is met, type "or" into the field.

Fields in the second row of the "IF" section correspond to the fields immediately above them. They should be completed using the guidelines outlined above.

The "THEN GO TO:" Section

This section contains the destination of the branch. The kinds of destinations and examples of the way you'd type each are:

Destination	Format Example
A TEXT page in the same lesson	LAB1 (LAB1 is a text label which must be on the TEXT page you are branching to. It can be anywhere on the page. The lesson will pick up at the line where the label is.)
The beginning of another AUTHOR I lesson	*TEACH LESSNAME
A TEXT page in a different AUTHOR I lesson	*TEACH LESSNAME,LAB1 (LAB1 here is used just like LAB1 above.)
The beginning of a program written in the BASIC language	*BASIC PROGNAME (See page 103 of AUTHOR I Manual for more information on this option.)
The beginning of a program written in a machine language	*PROGNAME, parameter, parameter,.. (See page 104 of AUTHOR I Manual for an explanation of "parameter" and more information on this topic.)

In the examples above, the asterisk in the first character position of the field means that the branch is sending the student outside of the current AUTHOR I lesson. The lesson or program to which you branch must be on a diskette that is in a disk drive when the lesson reaches the CONTROL page. Also, for branches to a BASIC or machine language program, the AUTHOR I module CHAIN must be on a diskette which is in a disk drive when the lesson reaches the CONTROL page. This module is on the TRS-80 AUTHOR I disk which accompanies this package. This module is on the TRS-80 AUTHOR I Lesson Presentation Package (Cat. No. 26-2707) diskette. One of these diskettes must be in a disk drive when a branch outside a lesson occurs. Therefore, you must either have two disk drives--one of the lesson diskette and one for the AUTHOR I diskette with CHAIN on it--or you must move your lessons onto the AUTHOR I diskette.

APPENDIX B

Software Evaluation Guide

A SOFTWARE EVALUATION GUIDE FOR THE LANGUAGE ARTS

Robert M. Hertz

Developing a form that is a useful guide to courseware evaluation specifically for the language arts is admittedly a problem. If one strives for completeness, then the form is too long to provide a capsule summary of the usefulness of particular courseware. If it is a more comfortable length, then it suffers from ommission of certain items that some people consider critical to proper courseware evaluation. In the following evaluation form, I have chosen to be as complete as possible so that all factors will be presented to the user, at least those factors that I could think of or could find in presently existing evaluation forms that I could locate. Rather than try to legislate for the readers what they should consider relevant in courseware evaluation, I suggest that the readers select from the following form those factors that they consider relevant or important and edit them into an evaluation form of more usable length to suit themselves. The following evaluation guide borrows from and is an amalgamation of ideas taken from various sources.

LANGUAGE COURSEWARE EVALUATION FORM

PROGRAM TITLE: _____

VENDOR:

Name _____

Address _____

Phone ( ) _____

AUTHOR/DEVELOPER:

Name _____

Address _____

Phone ( ) _____

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REVIEWED BY:

Name _____

Address _____

Phone ( ) _____

GRADE LEVEL:

Primary, K-3 _____

Intermediate, 4-6 _____

Junior HS, 7-8 _____

Senior HS I, 9-10 _____

Senior HS II, 11-12 _____

College _____

Adult _____

CONTINUITY:

Isolated lesson _____

Number of lessons in courseware package _____

Partial series of lessons _____

Complete series of lessons _____

COURSEWARE TYPE:

Drill and practice _____

Tutorial _____

Simulation _____

Game _____

Authoring software _____

Utility software _____

Computer-assisted testing _____

APPLICATION:

English to native speakers _____

ESL _____

Bilingual education _____

(specify language) _____

Foreign language _____

(specify language) _____

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IF ESL:

TESOL level _____

Language of instruction

English _____

Other (specify) _____

IF FOREIGN LANGUAGE:

Level by semesters of FL study _____

Language of instruction

English _____

In FL _____

Other (specify) _____

LANGUAGE ARTS AREA:

1. Argumentation _____
2. Aural comprehension _____
3. Capitalization _____
4. Diction _____
5. Dictionary use _____
6. Grammar, language structure _____
7. Grammar, skills _____
8. Letter writing _____
9. Library use _____
10. Paragraphing _____
11. Pronunciation/phonics _____
12. Puncuation _____
13. Reading comprehension _____
14. Research paper _____
15. Sentence logic, unity and effectiveness _____
16. Speaking _____
17. Speed reading _____
18. Spelling _____
19. Vocabulary building _____
20. Word processing, text editing _____
21. Writing, grammar _____
22. Writing, mechanics _____
23. Writing, organization _____

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SUITABILITY OF CONTENT:

Is the material linguistically sound? Y___ N___

Is the material pedagogically effective? Y___ N___

Is the material outdated? Y___ N___

Can the courseware be used both to introduce and reinforce the material? Y___ N___

Can the courseware be used only to reinforce the material but not to introduce it? Y___ N___

What are the stated behavioral objectives? _____

_____

_____

Will the courseware achieve these behavioral objectives? Y___ N___

Is the courseware task-oriented? Y___ N___

Is the content appropriate to the grade level for which it was intended? Y___ N___

Is the reading level appropriate for the grade level of the content? Y___ N___

Is the material suitable for students with a wide range of ability levels? Y___ N___

Does the courseware teach language use as a skill? Y___ N___

Or does it teach about the rules of language? Y___ N___

Does the level of difficulty vary according to the demonstrated ability level of the student? Y___ N___

Is the courseware content substantively correct? Y___ N___

Are explanations complete and adequate in number? Y___ N___

Are there adequate examples? Y___ N___

Are concepts presented well? Y___ N___

Are there adequate reinforcement activities? Y___ N___

Are there adequate evaluation activities? Y___ N___

COMPATIBILITY WITH REGULAR TEXTBOOKS:

Is the material compatible with the regular textbooks? Y___ N___

If the courseware is keyed to a certain text, indicate the name of the text.

Author _____ Edition _____

Title _____

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Can the courseware be used with other textbooks? Y___ N___

If yes, which ones?

Author _____ Edition _____

Title _____

Author _____ Edition _____

Title _____

TEACHING CAPABILITIES:

Does the courseware provide any of the following aids to the student?

A "help" option Y___ N___

Hints when he makes errors Y___ N___

Built-in dictionary Y___ N___

Review of lesson Y___ N___

Remedial presentations when the student makes an error? Y___ N___

If yes, is the remediation

a. specific to the question that he/she missed? Y___ N___

b. the same for all errors of the same type? Y___ N___

Is the student politely told when he/she is right or wrong? Y___ N___

Is the pacing of the lesson

a. controlled by the student? Y___ N___

b. determined by the courseware? Y___ N___

Does the courseware provide second chances to answer the question correctly? Y___ N___

MICROCOMPUTER EQUIPMENT:

Microcomputer and model	D=disk T=tape C=cartridge	Memory required, kilobytes	Price
1._____	D T C	_____K	$_____
2._____	D T C	_____K	$_____
3._____	D T C	_____K	$_____

PERIPHERALS AND ACCESSORIES NEEDED:

Printer _____

Voice synthesizer _____

Supertalker _____

Cassette control device _____

Interactive videodisc player and videodisc _____

Joystick(s) _____

Cassette player _____

DOCUMENTATION:

Does the courseware package include printed

- Pretests? Y___ N___
- Posttests? Y___ N___
- Worksheets? Y___ N___

Is the teacher's information

- provided by tutorial courseware? Y___ N___
- provided by printed materials? Y___ N___
- not provided? Y___ N___
- clearly presented? Y___ N___
- complete and easy to reference? Y___ N___

Is the student's information

- provided by tutorial courseware? Y___ N___
- provided by print materials? Y___ N___
- not provided? Y___ N___
- clear to students at grade level for which material is intended? Y___ N___
- complete and easy for student to reference? Y___ N___

VENDOR SUPPORT:

Does vendor answer telephone questions? Y___ N___

Does vendor provide toll free number? Y___ N___

- 800 line: 800-_____
- Accepts collect calls? Y___ N___

Is a back-up copy provided? Y___ N___

What is the policy for replacing damaged/worn disks?

_____

_____

Does the vendor allow previewing? Y___ N___

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USE OF INTERACTIVE CAPABILITIES OF THE COMPUTER:

Does the program require frequent student responses? Y___ N___

Is the program merely presenting the material and not making significant use of the interactive capabilities of the computer? Y___ N___

AESTHETICS AND ACCURACY:

Is screen display easy to read? Y___ N___

Does the screen display suffer from clutter? Y___ N___

Does the program rely on a theme of gratuitous violence? Y___ N___

Is the textual material free from spelling errors, grammatical errors, awkward or clumsy phrasing or explanations? Y___ N___

Are the screen displays easy to read? Y___ N___

Are graphics used effectively and appropriately? Y___ N___

Do the graphics overwhelm the lesson content? Y___ N___

COURSEWARE OPERATION:

Does the courseware operate without jamming? Y___ N___

Does the system leave the program if the program if the student makes certain kinds of responses? Y___ N___

Does the courseware accept various kinds of student responses, e.g. either upper or lower case is acceptable if response is by letter? Y___ N___

Will the program accept the answer typed out rather than indicated by letter or number? Y___ N___

Can the courseware be modified by the teacher, e.g. can the words in a spelling lesson be changed? Y___ N___

Does the courseware require that the student type in the answer in a rigid format, or does it accept extra spaces, minor spelling and capitalization errors? Y___ N___

Does the courseware allow the student to exit the lesson when he/she has demonstrated a certain level of proficiency? Y___ N___

CLASSROOM MANAGEMENT:

Does the courseware keep a record of the student's level of achievement? Y___ N___

Is a running score presented as the lesson progresses? Y___ N___

Is the final score stored on disk for permanent records? Y___ N___

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APPENDIX C

The Journal1 Database System

THE JOURNAL1 DATA BASE SYSTEM

The JOURNAL1 Database has been set-up on a TRS-80-Model 4 Computer in the Office of Bilingual Education, Compton Unified School District.

The purpose of the JOURNAL1 Database is to facilitate access to computer and technical journals and periodicals housed in the Bilingual Office.

The Journal Title Listing is a list of the journals which comprise the database.

The Subject Heading Listing is a listing of subject headings by which the user may search the database.

A concise User Instruction Guide is available, explaining to interested individuals how to use the database system for research and instructional purposes.

How to Do a Journal Title Search

(1) Press "Enter" to bypass the Subject Area Index.

(2) Enter Scan Field __1__, press "Enter."

(3) Press the space bar once, then enter the Journal Title from the Journal Title List. Spell the title exactly as it appears on the list, spaces "count" on the computer so be exact!

(4) Press "Enter" twice to bypass the next two functions.

- The first issue of the journal you have selected from the Bilingual Collection will appear on the screen.
- Use the Directional Arrow (down) to look for the exact month of the journal.
- If you would like a copy of the screen report, press "H."
- To quit, or to search for another Journal Title, press "X."

[Adopted from "JOURNAL1 DATABASE," Nancy Jean Roth, July 1984.]

(1) The computer screen will have the following text:

Index by Subject Area _____

(2) Press the space bar once, then enter the Subject Area you wish to search from the Subject Heading List. Be sure to enter the Subject Heading exactly as it appears on the list!

- The first magazine issued indexed in the Subject Heading area you have chosen will appear on the screen.
- Use the Directional Arrow (down) to look for the next periodical in the Subject Area.
- If you would like a copy of the screen report, press "H."
- To quit, or to search in another Subject Area, press "X."

List of Journal Titles Available in Database

ACCESS
BASIC COMPUTING
BYTE
BILINGUAL JOURNAL
CALICO JOURNAL
COMPUTE
COMPUTER DECISIONS
COMPUTER USER
COMPUTING TEACHER
COMPUTRONICS
CREATIVE COMPUTING
DIGIT
FAMILY COMPUTING
80 MICRO
80 MICROCOMPUTING
80 U.S.
EDUCATIONAL COMPUTER MAGAZINE
ELECTRONIC EDUCATION
ELECTRONIC LEARNING
HIGH TECHNOLOGY
KAPPAN
ON COMPUTING
PERSONAL COMPUTING
POPULAR COMPUTING
POPULAR SCIENCE
SCIENCE 82
SCIENTIFIC AMERICAN
TECHNOLOGICAL HORIZONS IN ED.
TRS-80 MICROCOMPUTER NEWS
TECHNOLOGY
TODAY

[Adopted from "JOURNAL1 DATABASE," Nancy Jean Roth, July 1984.]
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BILINGUAL EDUCATION

COMPUTERS

COMPUTERS- & VIDEOTEX

COMPUTERS-APPLICATIONS

COMPUTERS-APPLICATIONS & S.W.

COMPUTERS-EDUCATION

COMPUTERS-EDUCATIONAL

COMPUTERS-LANGUAGE LEARNING

COMPUTERS-LITERATURE

COMPUTERS-MANAGEMENT TOOL

COMPUTERS-PERSONAL

COMPUTERS-POPULAR

COMPUTERS-SCIENCE & ENGINEERING

COMPUTERS-SMALL SYSTEMS

COMPUTERS-TANDY/RADIO SHACK

COMPUTERS-TRS-80

COMPUTERS-YOUNG PEOPLE

EDUCATION

SCIENCE

[Adopted from "JOURNAL1 DATABASE," Nancy Jean Roth, July 1984.]

APPENDIX D

Evaluation Form

EVALUATION OF WORKSHOP
FIRST SESSION COMPUTER TRAINING COURSE - ESEA, TITLE VII

1. To what degree have the contents of this program provided -	Greatly	Substantially	Moderately	Slightly	Not at All
a. Information relevant to your needs to know something about a microcomputer					
b. New Information					
2. Please rate the quality of presentation	Excellent	Very Good	Good	Fair	Poor
a. Pacing					
b. Clarity					
c. Program assignments					
3. Please rate the syllabus	Excellent	Very Good	Good	Fair	Poor
a. Format					
b. Organization					
c. Usefulness					

4. What part of this program did you find most useful?

_____

5. What part did you find least helpful?

_____

6. Was there any part you would have liked covered in greater depth?

_____

7. What did we omit that you would have liked us to cover?

_____

8. What were your expectations for this program?

_____

9. Did the program meet your expectations?

_____

10. What other types of computer training would you be interested in?

_____

11. Any additional comments, suggestions, recommendations?

_____

12. Training location _____ Date _____

Your position (Title) _____

APPENDIX E

Reference Material

NEW — Completely removes current program from work-space.

RUN — Executes the program currently in work-space.

RUN (name of program) — Loads and executes the program requested from disc.

LOAD (name of program) — Obtains the program from the disc and loads it into the computer work-space. The program remains in work-space and can be listed by the command LIST or can be executed by the command RUN.

LIST — Gives a line by line listing of the program in the work-space. LIST 10, 50 will list the program beginning with line 10 and continue through line 50.

SAVE (name of program) — The program currently in the computer work-space is saved on the disc and has the name assigned to it typed after the word SAVE. ***CAUTION*** DO NOT USE THE SAME NAME TWICE!!

CATALOG — This prints a list on the screen of the names of all programs and files on the disc.

Examples:

A ↑ Indicates Applesoft Program	015 ↑ Number of Sectors	SEARCH ↑ Name of Program
T ↑ Indicates Text File	007 ↑ Number of Sectors	P/S GEOM ↑ Name of Text File

DELETE (name of program) — ***CAUTION*** This command deletes program from disc. The program is then gone forever unless you have a back-up disc.

HOME (Apple)
(TRS-80)
CLS — This command clears the screen so you can see where you are in a clearer manner. This does not clear the program from memory.

Command	Purpose	Example
PRINT	Types out message in quotation marks or Prints values of numerical expressions or BOTH	100 PRINT "HELLO or 110 ? "HELLO 200 ? X,Y+3 or 220 ? "THE AREA IS" A*B
INPUT	Requests data for certain variables to be entered from the terminal during the program ALSO Can print out a statement before requesting data so user of program knows what to input	400 INPUT A 420 INPUT X,Y 500 INPUT "ENTER YOUR 520 INPUT "ENTER SIDE A OF TRIANGLE ABC" ;A
GOTO	This is an immediate branch it sends the program execution to another line	80 GOTO 300
IF...THEN	Conditional statement if condition is met, executed command following word THEN. If condition is not met, executes the next statement in line of program.	210 IF X = 0 THEN 800 220 PRINT X 290 INPUT Y 300 IF X > 5 THEN Y=Y+1 310 PRINT Y
FOR - - - - NEXT	Sets up and runs the body of a loop a stated number of times. STEP can be used to change how the loop increases or decreases. Closes the loop.	100 FOR I = 1 TO 11 110 PRINT I 120 NEXT I or 200 FOR K = 1 TO 9 STEP 3 210 R = K + 5 220 PRINT R 230 NEXT K
REM	Allows you to insert comments in stream of program.	20 REM FIND THE AREA
READ	Assigns values to variable from DATA statements	110 READ A,B,C
DATA	Holds the data (numbers or character strings) for READ statements	1200 DATA 2,3,4,5,6,7
END	Usually the last statement in program.	

A variable is the name of a location in the memory of the computer. A variable location can contain a real number, an integer, or a string of characters.

A variable can be one or more characters long with the exception that the first character must always be a letter. The variable can be up to 238 characters long but the APPLE only recognizes the first two characters during execution. This means that the variable APEX and the variable APRICOT would represent the same location to the computer during execution.

The following are the three types of variables used by APPLESOFT.

String variables -- Must always end with $

A string variable is one which denotes a string of characters such as names, addresses, words, or sentences. A string variable may contain from 0 to 255 characters.

Examples: A$ BD$ C1$ NAME$ CAULIFLOWERS$

Real variables --

A real variable is one which stores or denotes a real number. It can be a number with or without a decimal point included. The range of values allowed is +/- 9.999999999 E+37

Examples: A B CD DAD W4 WILLY

Integer variables -- always end with %

An integer variable is one which is used to store an integer. An integer is any Must number in the following set of numbers. (...-3,-2,-1,0,1,2,3,...). The limitation on an integer variable is the following: +/- 32767

Examples: A% KJ% REAL% R45637485768%

NOTE: You could use all of the following variables in the same program without causing the computer any problems.

```
10  A = 30.5
20  A% = 56.8
30  A$ + = "VARIABLES"
40  PRINT A$, A%, A
```

OUTPUT
VARIABLES 56 30.5

APPENDIX F

Glossary

SHORT GLOSSARY OF COMPUTER TERMINOLOGY

Assembler	A computer program that converts a higher-level (English-like) programming language into machine-readable instructions.
BASIC	A higher-level, English-like computer programming language. An acronym for Beginners' All-purpose Symbolic Instruction Code (see language).
Bit	The commonly used abbreviation for binary digit--the smallest unit of information recognized by a computer, e.g. 1,0.
Bug	An error. To 'debug' a computer program is to find and correct the errors in it so it will work properly.
Byte	The computer space needed to store one character (a letter, symbol, number, etc.) of information (see memory). 8 bits = 1 byte.
Cassette Recorder	An input/output device used to store information on a cassette tape or to load information from a tape into the computer memory.
Cassette Tape	A secondary storage device for a computer. Information is stored on magnetic tape.
Chip	A microprocessor that is a complete computer on a single chip of silicon (takes place of vacuum tube).
COBOL	A higher-level, English-like computer programming language (usually used in business applications).
Compiler	Software that translate a program language such as COBOL into machine-level language.
Courseware	Computer software specifically designed for use in classrooms.
CPU	An abbreviation for central processing unit, the portion of the computer where the programs in use are stored and carried out.
CRT	An abbreviation for cathode-ray tube. The display screen, which is in many cases an ordinary TV set. It is an output device for the computer.
Disk Drive	An add-on device that can store information on and retrieve it from a disk (see floppy disk and memory). It is an input/output device for the computer.

Floppy Disk — A soft plastic disk, about the size of a 45 rpm record, on which information - either programs or data - can be recorded using a disk drive (see memory). A secondary storage device for the computer.

FORTRAN — A high-level computer programming language, suitable for scientific purposes. FORmula TRANslator.

Hard Copy — The printed results of a computer program.

Input — Any information typed into the computer or loaded in from a disk or a cassette tape.

Language — A code used by a programmer to organize a computer's circuits so that the machine will perform specific tasks on demand. The microcomputers now showing up in schools generally come with at least one built-in language - usually BASIC. Other languages exist, and some of them may be purchased as options for the most popular microcomputers. (The advantage of one language over another is a matter of passionate disagreement among computer programmers. So far the only available specifically kid-accessible language is LOGO.)

Machine Language — A binary language all digital computer products must use to perform processing. All other programming languages must be compiled or translated ultimately into binary code before entering the system. This binary language is used directly by the machine, and is machine language.

Memory — The circuits within computer systems where information and programs are stored. In general, the larger the memory space, the more powerful the computer. Memory size is expressed in kilobytes, with one kilobyte equaling 2^{10} or 1,024 bytes. Thus, a 16K machine has space to store up to 16,000+ characters of information at any one time. Information and programs can also be stored on and retrieved from external memory sources, such as floppy disks and tape cassettes, which are added on, or peripheral, to the computer. Disks are generally more useful than cassettes for the same reason that a specific song is more quickly found on a record than on a tape.

MODEM — An abbreviation of MOdulator - DEModulator. A device that allows information to pass from one computer to another over telephone lines.

Off-Line — A word or data processing operation performed on stand alone equipment, not being connected to another central processor or computer system.

On-Line	A word or data processing operation which is performed on a local system connected to and sharing the facilities of a remote central processor.
Output	The results of running a computer program. The output may appear on a monitor or be printed on a printer.
Peripheral	An add-on that is more often than not expensive and that can send information to and/or receive information from a computer. Printers, MODEMS, disk drives and voice simulators are peripherals.
PL/1	A high-level programming language, designed for use in a wide range of commercial and scientific computer applications which has features of FORTRAN and COBOL plus others.
Printer	An output device which produces the hard copy of a program.
RAM	An acronym for random-access memory. When the machine is turned on, this is the 'in-the-machine' space available for the storage and manipulation of programs and data (see memory). It is temporary memory that stores data or programs inside the computer. Anything stored in RAM is erased when the computer is turned OFF.
ROM	An acronym for read-only memory. The information in ROM cannot be changed by the user. It is permanent information stored in the machine. It is usually built-in by the manufacturer and contains operating information, such as a language like BASIC (see memory and language).
Software	Data and programs (as opposed to hardware, the machine itself and its peripherals).
String	Any letters, characters, or numbers which will not have arithmetic operations performed on them.
Statement	A word or phrase in BASIC which is used to give the computer an instruction.

APPENDIX G

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Courtesy of Dr. Robert Hertz

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Courtesy of Dr. Robert Hertz

APPENDIX H

Certificate

Compton Unified School District

The Bilingual Education Department

awards this

Staff Development Certificate

in

To _____

for completion of requirements at the staff inservice training session held on_____

PROJECT DIRECTOR, ACADEMIC EXCELLENCE PROJECT